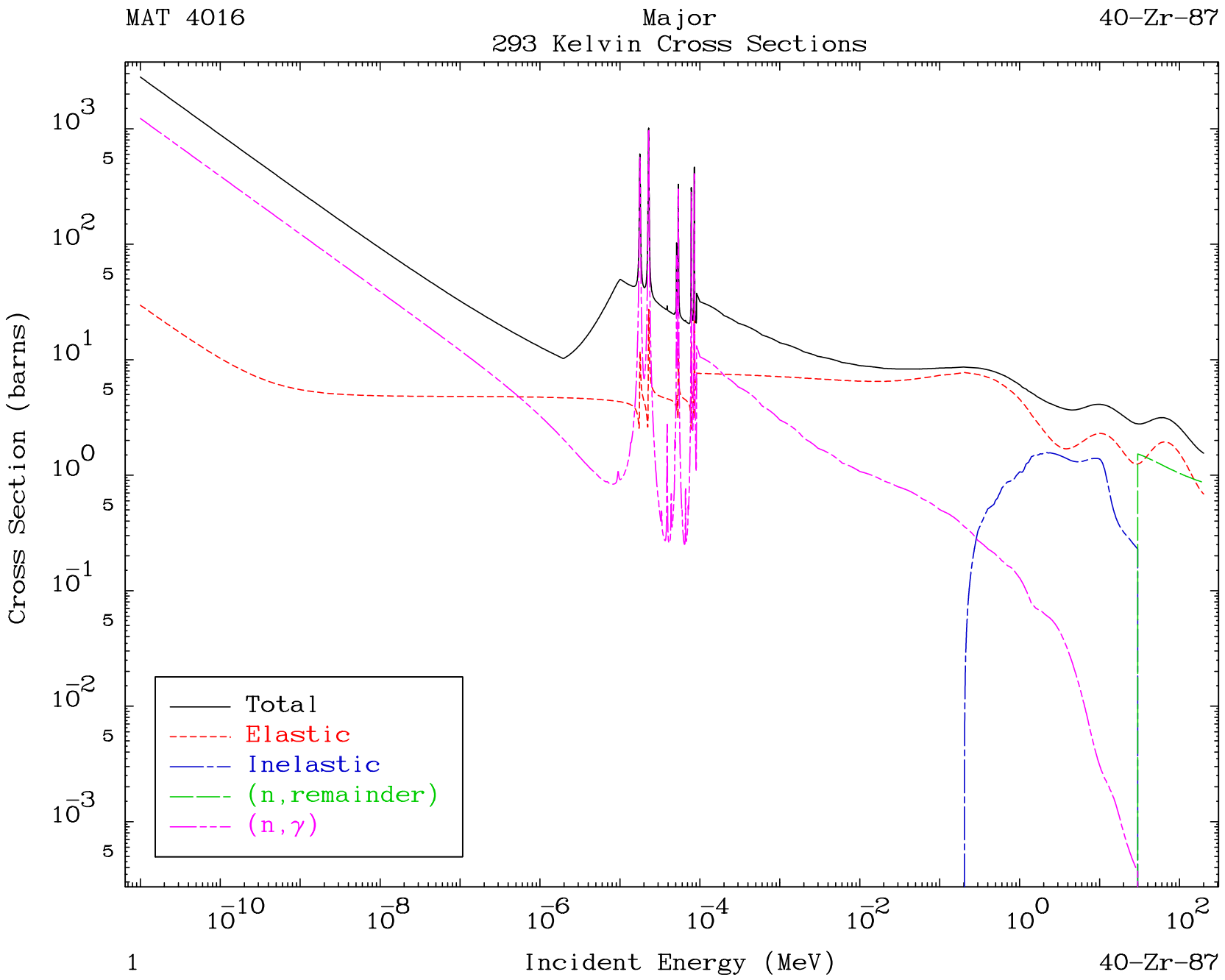
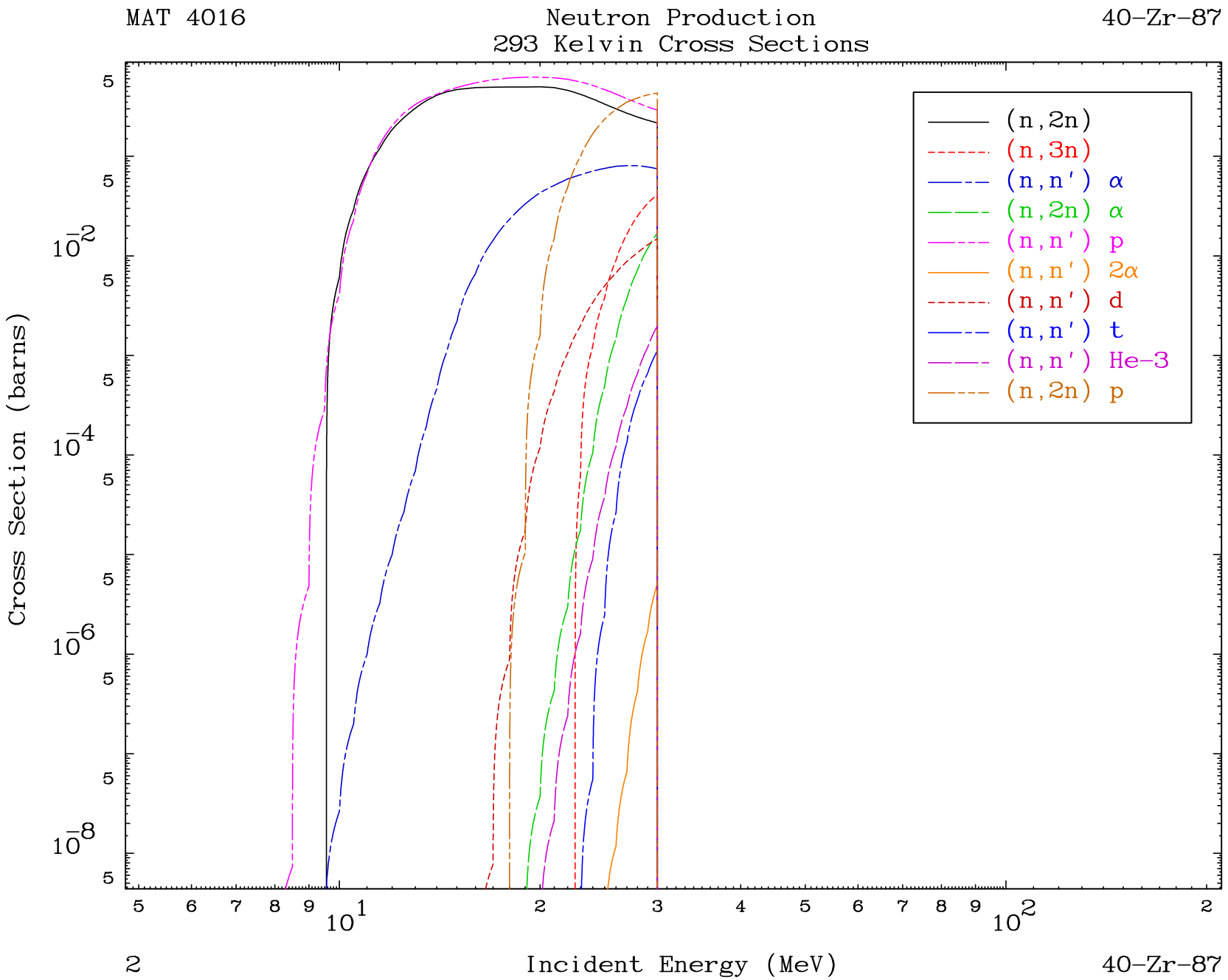
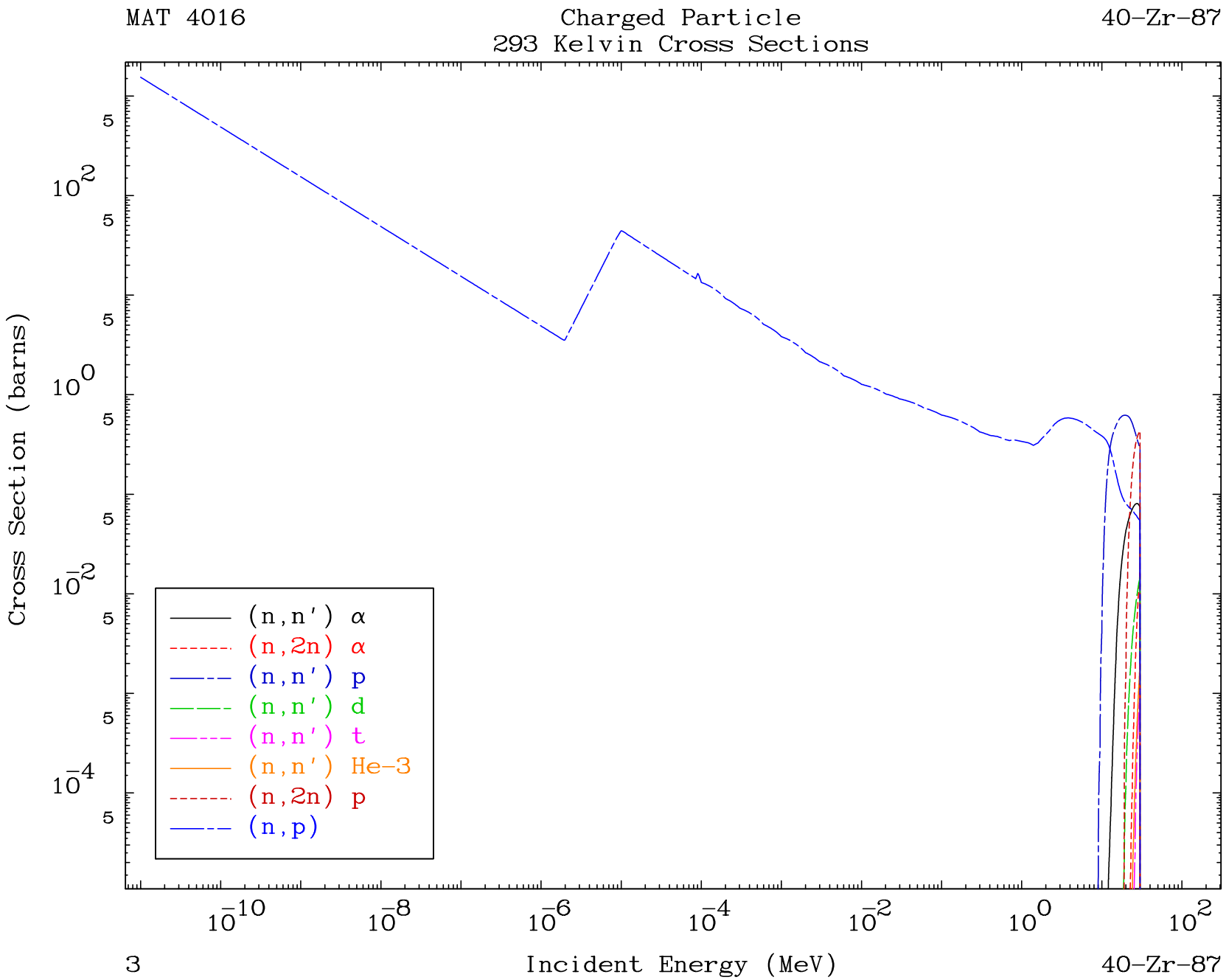
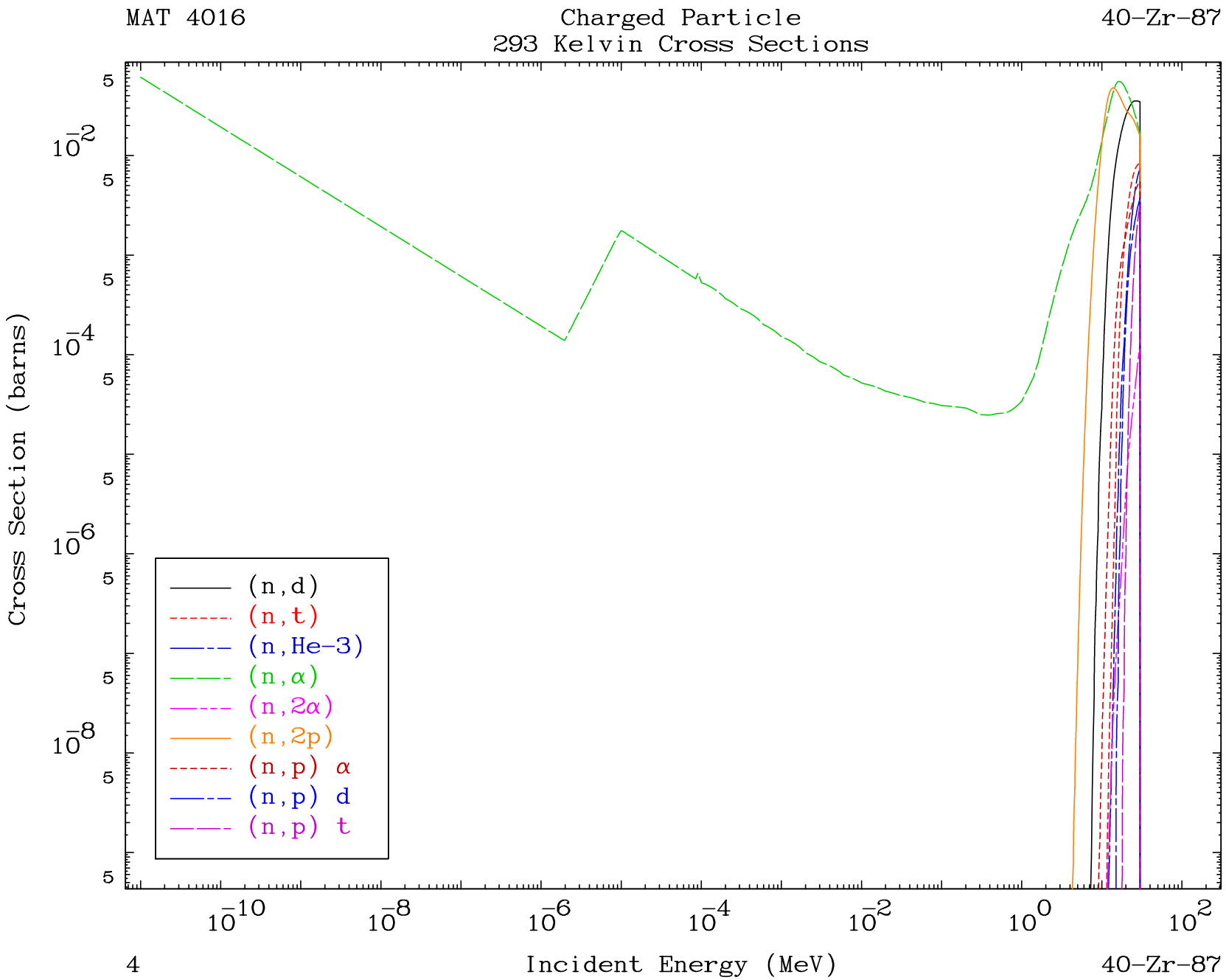
Program EVALPLOT
(Version 2017-1)
by
Dermott E. Cullen
(Present Contact Information)
Dermott E. Cullen
1466 Hudson Way
Livermore, CA 94550
U.S.A.
Tele: 925-443-1911
E.Mail:redcullen1@comcast.net
Web:redcullen1.net/HOMEPAGE.NEW

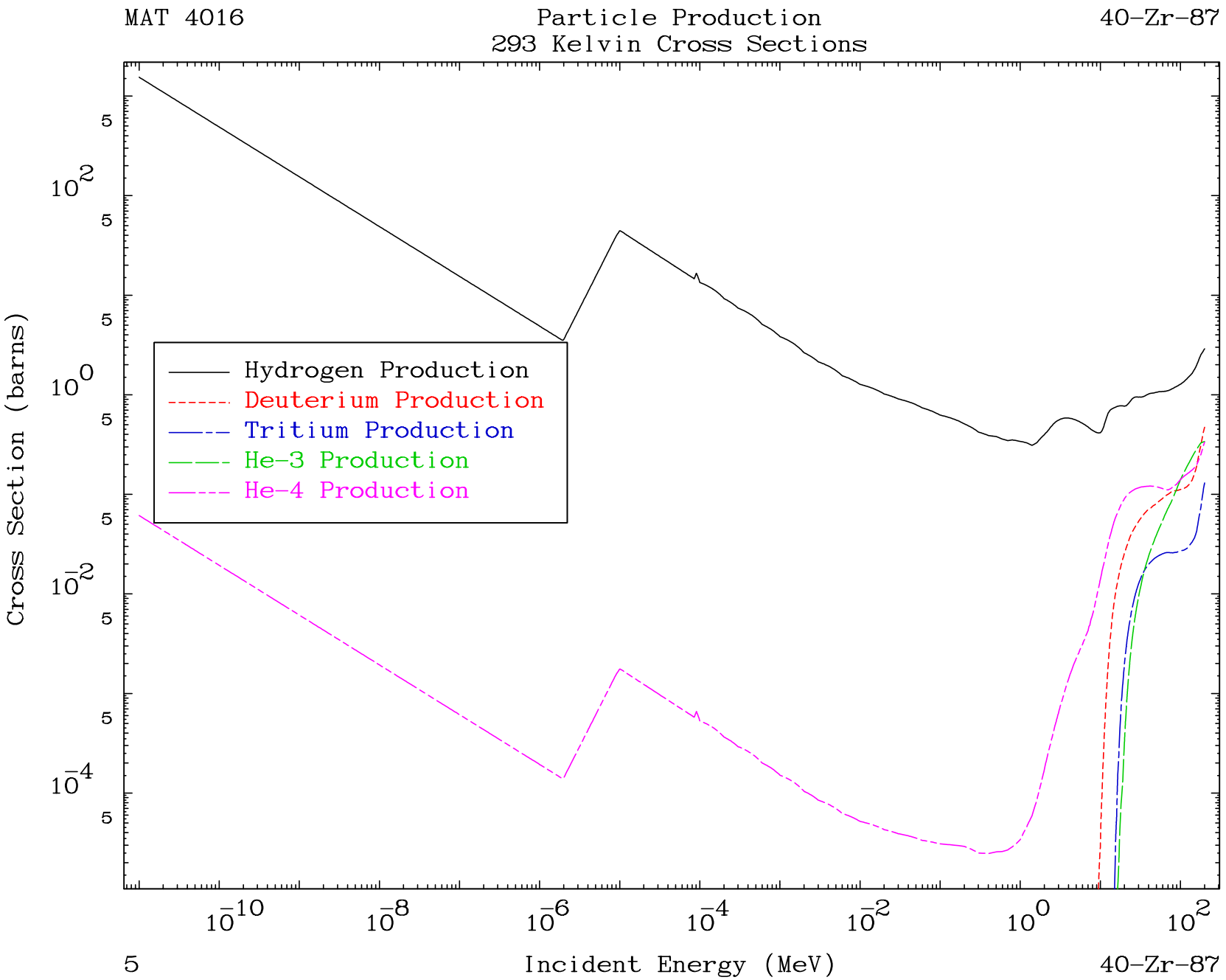
Press Mouse Button to Start

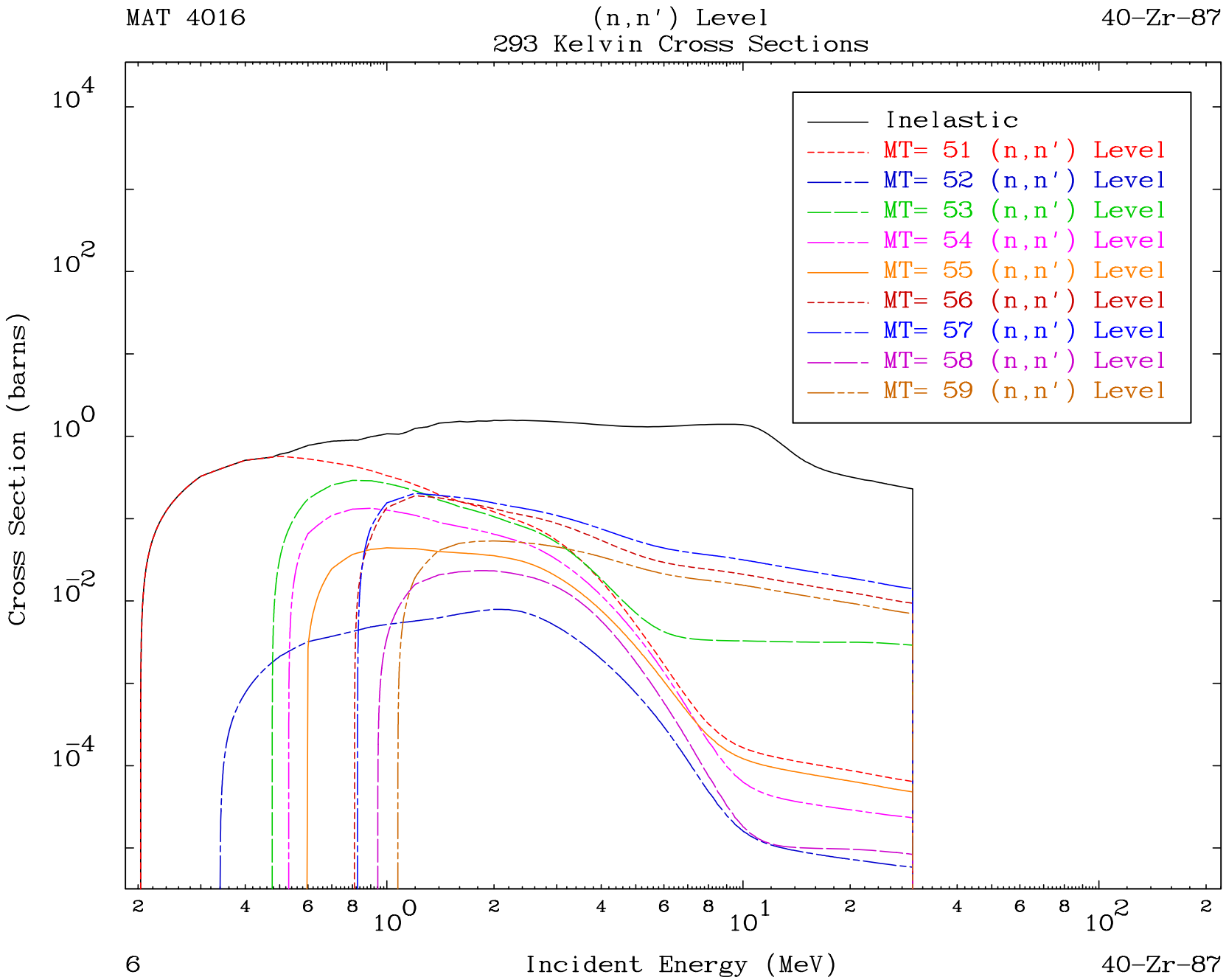

MAT 4016
Major
40-Zr-87
293 Kelvin Cross Sections
Cross Section (barns)
Incident Energy (MeV)
Total
Elastic
Inelastic
(n,remainder)
(n,γ)
1
40-Zr-87

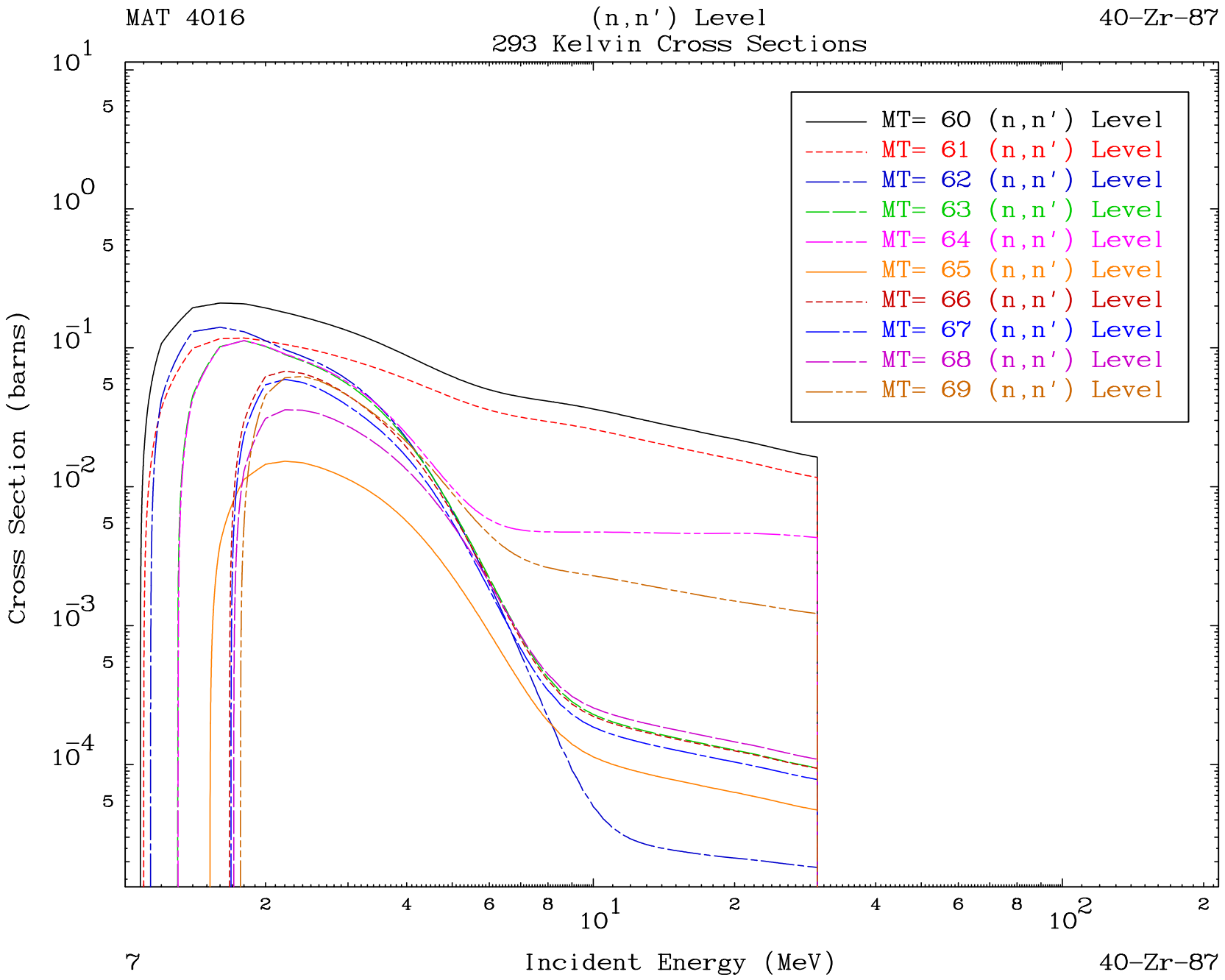

MAT 4016
Neutron Production
293 Kelvin Cross Sections
40-Zr-87
Cross Section (barns)
Incident Energy (MeV)
40-Zr-87
(n,2n)
(n,3n)
(n,n') α
(n,2n) α
(n,n') p
(n,n') 2α
(n,n') d
(n,n') t
(n,n') He-3
(n,2n) p

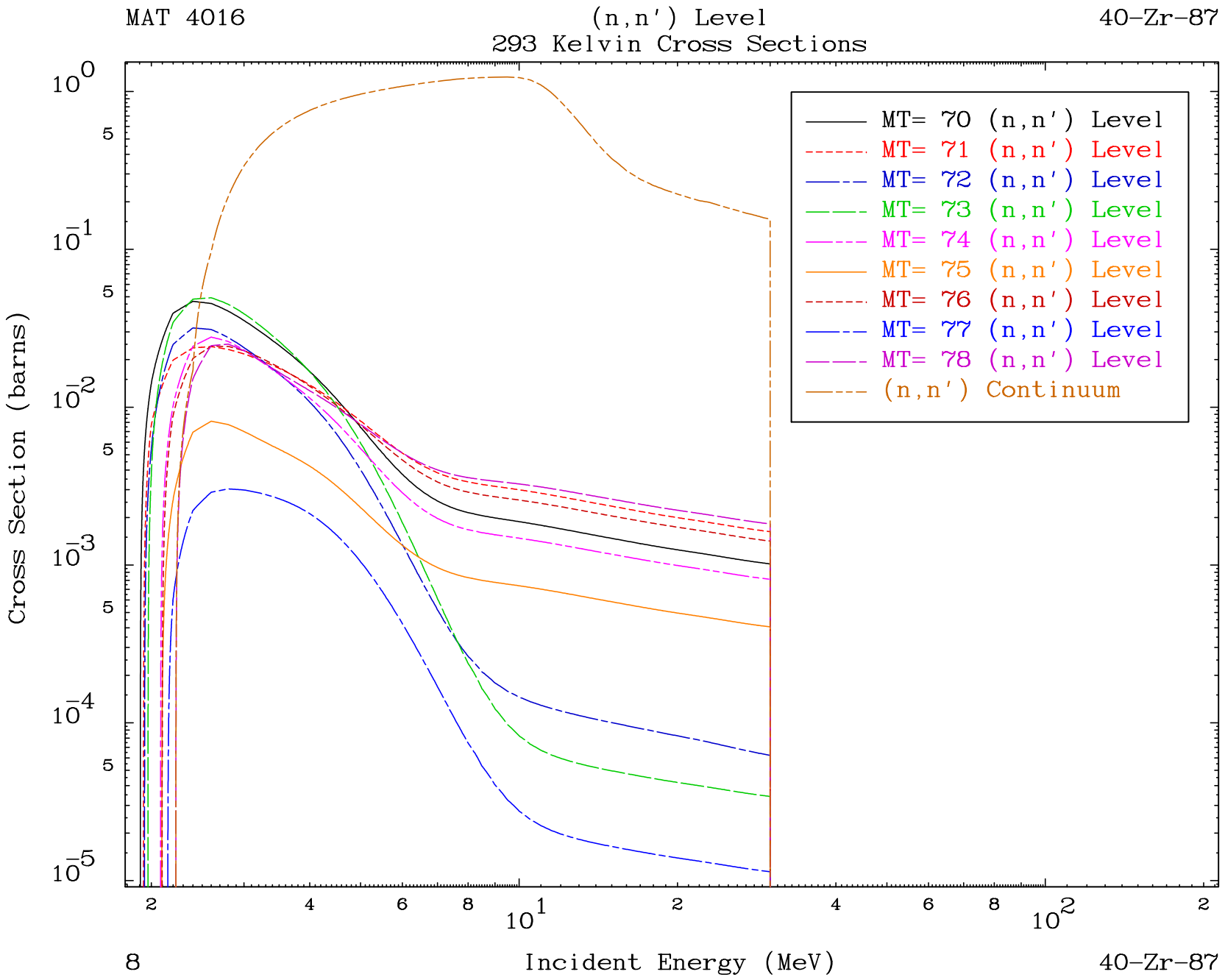

MAT 4016
Charged Particle
293 Kelvin Cross Sections
40-Zr-87
Cross Section (barns)
10^2
10^0
10^-2
10^-4
5
10^-10
10^-8
10^-6
10^-4
10^-2
10^0
10^2
Incident Energy (MeV)
(n,n') α
(n,2n) α
(n,n') p
(n,n') d
(n,n') t
(n,n') He-3
(n,2n) p
(n,p)
3
40-Zr-87

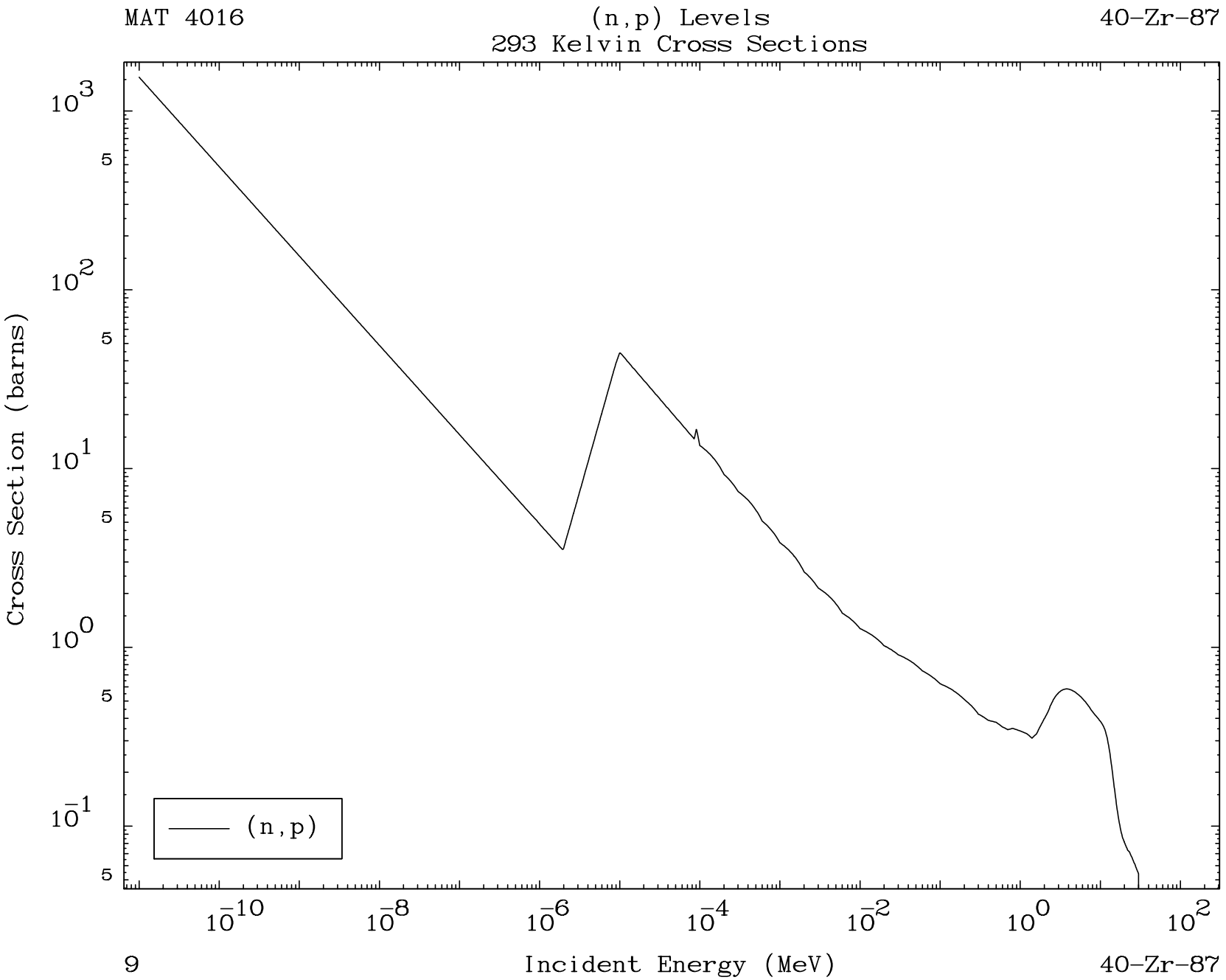

MAT 4016
Charged Particle
293 Kelvin Cross Sections
40-Zr-87
Cross Section (barns)
Incident Energy (MeV)
(n,d)
(n,t)
(n,He-3)
(n,α)
(n,2α)
(n,2p)
(n,p) α
(n,p) d
(n,p) t
4
40-Zr-87

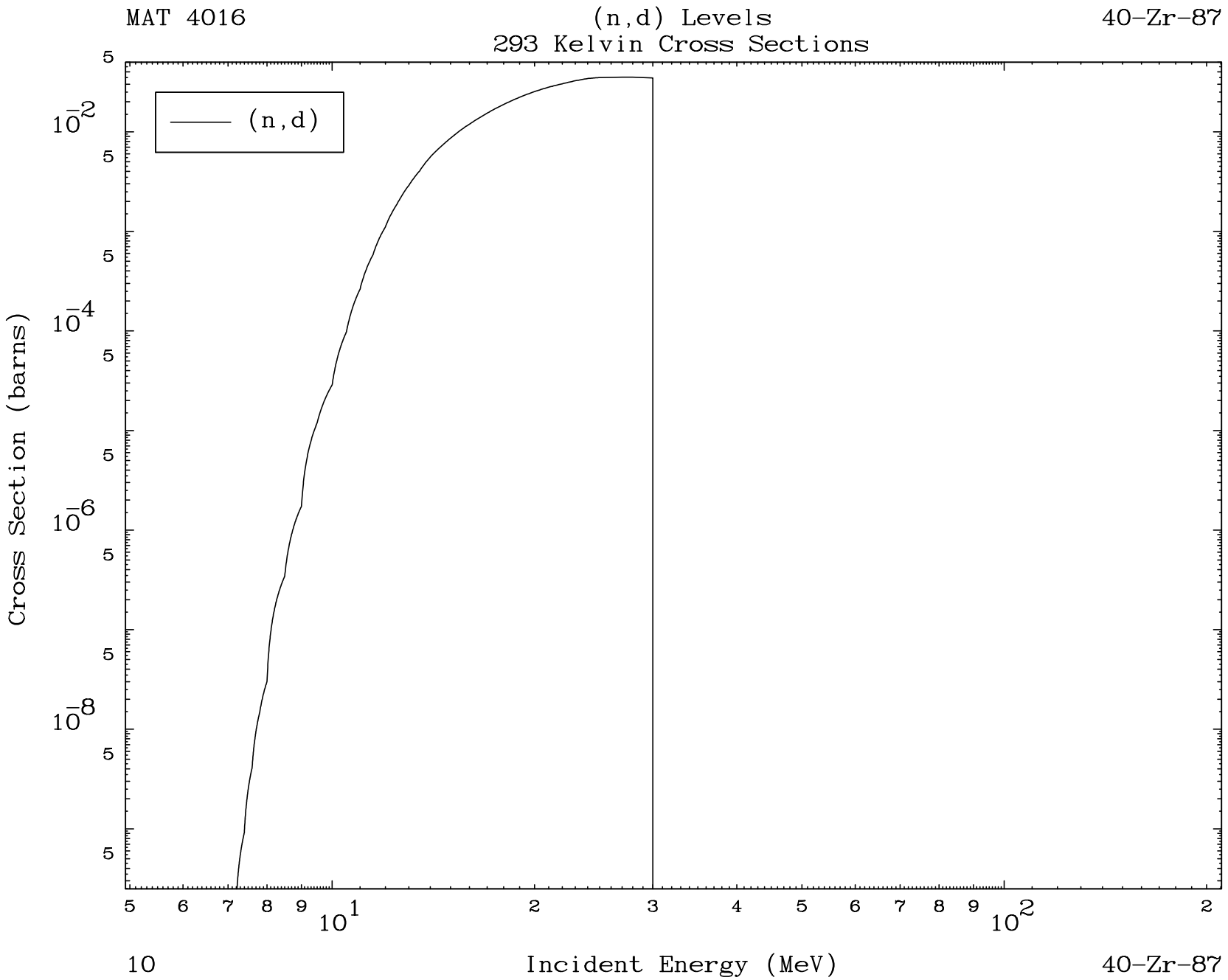

MAT 4016
Particle Production
293 Kelvin Cross Sections
40-Zr-87
Cross Section (barns)
Hydrogen Production
Deuterium Production
Tritium Production
He-3 Production
He-4 Production
Incident Energy (MeV)
40-Zr-87
5

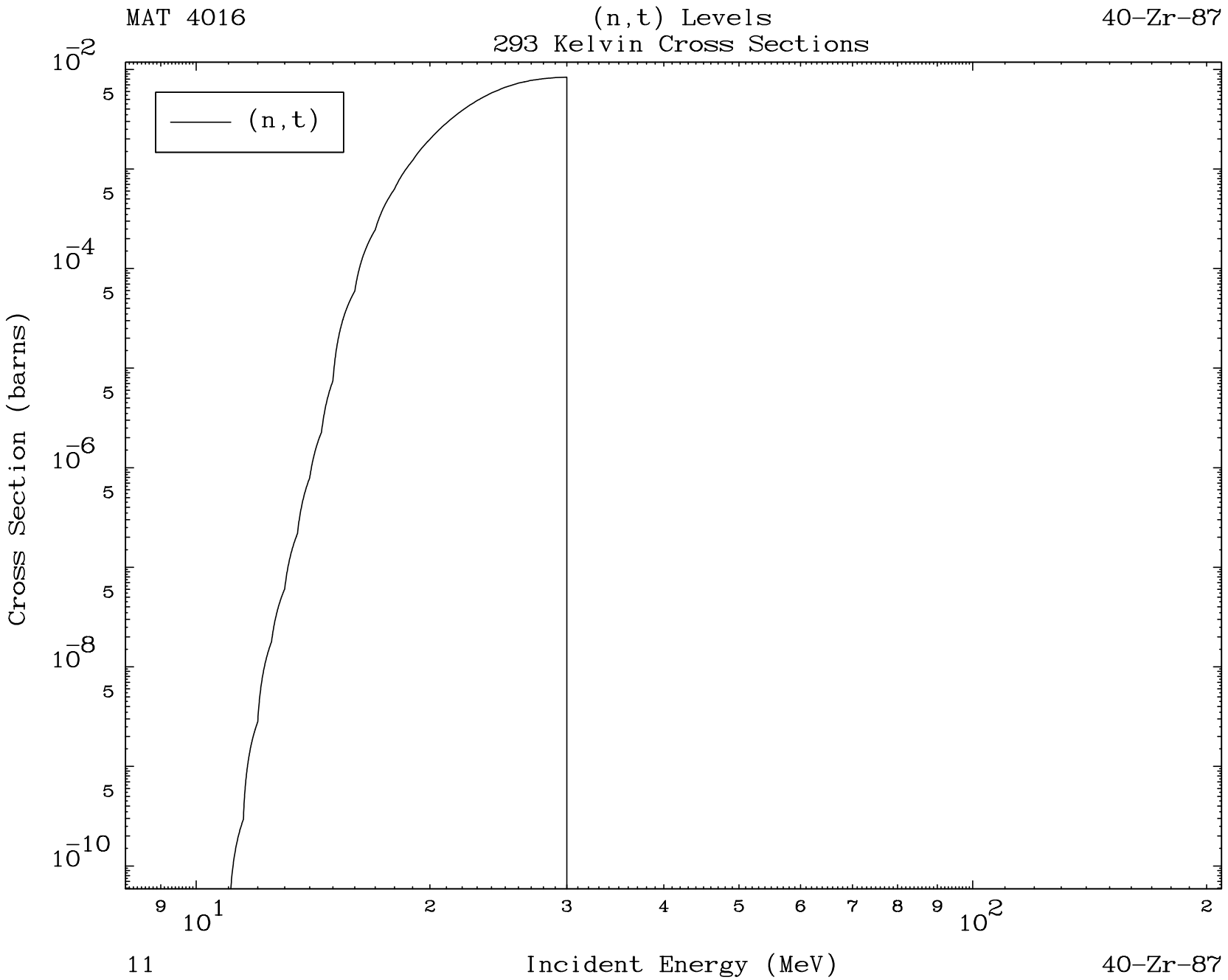

MAT 4016
(n,n') Level
293 Kelvin Cross Sections
40-Zr-87
Inelastic
MT= 51 (n,n') Level
MT= 52 (n,n') Level
MT= 53 (n,n') Level
MT= 54 (n,n') Level
MT= 55 (n,n') Level
MT= 56 (n,n') Level
MT= 57 (n,n') Level
MT= 58 (n,n') Level
MT= 59 (n,n') Level
Cross Section (barns)
Incident Energy (MeV)
6
40-Zr-87

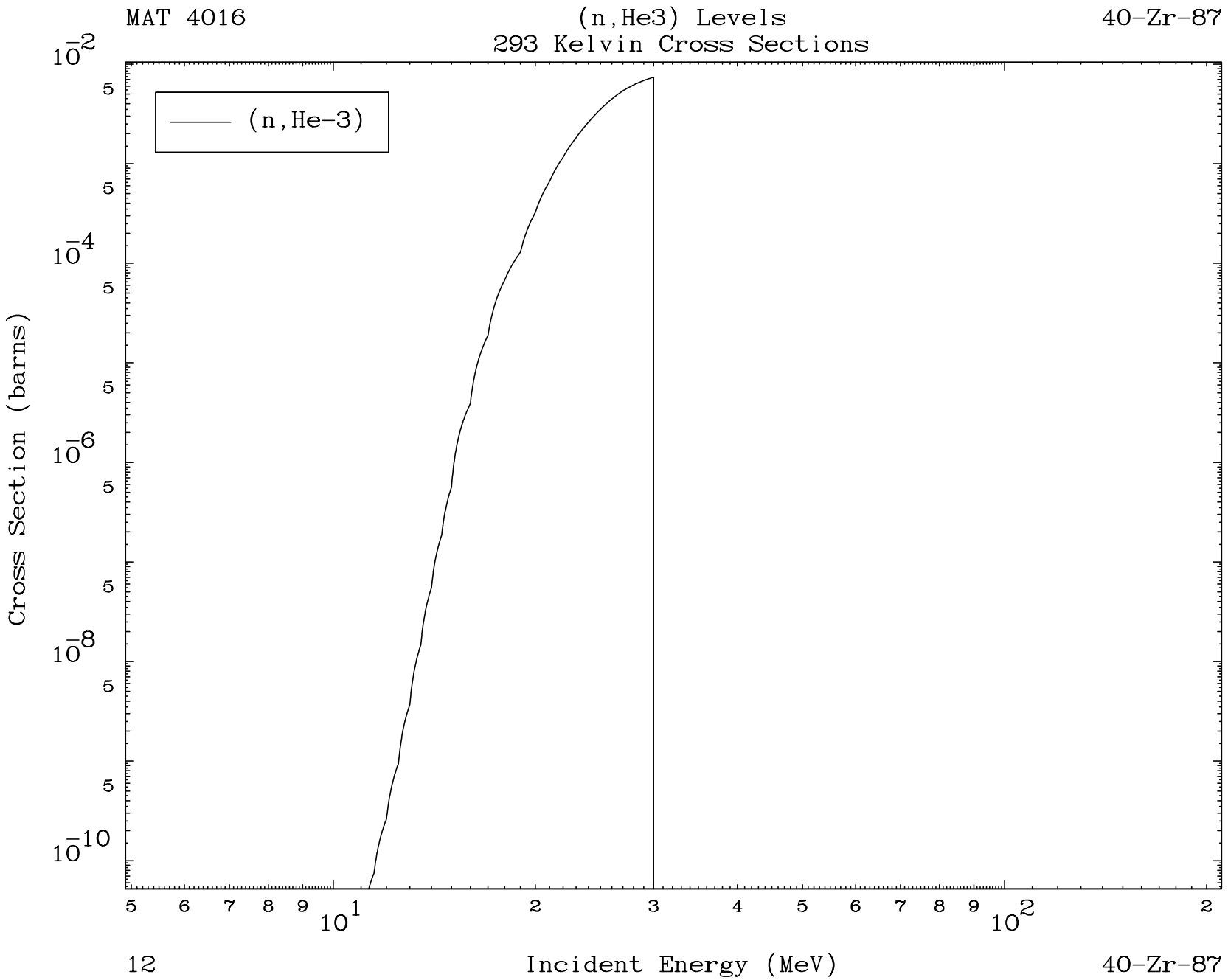

MAT 4016
(n,n') Level
293 Kelvin Cross Sections
40-Zr-87
Cross Section (barns)
Incident Energy (MeV)
40-Zr-87
7
MT= 60 (n,n') Level
MT= 61 (n,n') Level
MT= 62 (n,n') Level
MT= 63 (n,n') Level
MT= 64 (n,n') Level
MT= 65 (n,n') Level
MT= 66 (n,n') Level
MT= 67 (n,n') Level
MT= 68 (n,n') Level
MT= 69 (n,n') Level


MAT 4016
(n,n') Level
293 Kelvin Cross Sections
40-Zr-87
Cross Section (barns)
Incident Energy (MeV)
MT= 70 (n,n') Level
MT= 71 (n,n') Level
MT= 72 (n,n') Level
MT= 73 (n,n') Level
MT= 74 (n,n') Level
MT= 75 (n,n') Level
MT= 76 (n,n') Level
MT= 77 (n,n') Level
MT= 78 (n,n') Level
(n,n') Continuum
8
40-Zr-87

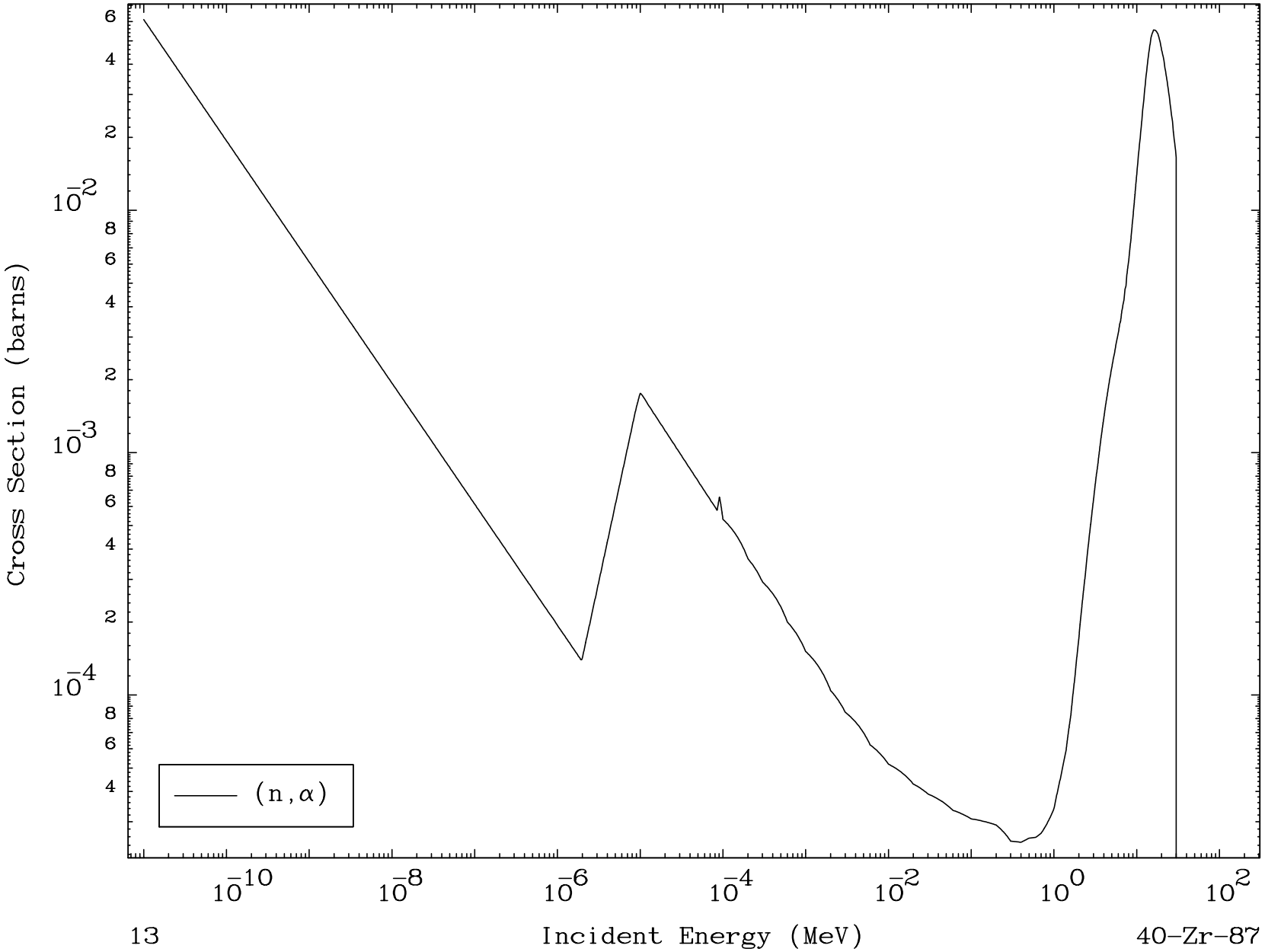

MAT 4016
(n,p) Levels
40-Zr-87
293 Kelvin Cross Sections
Cross Section (barns)
10^3
5
10^2
5
10^1
5
10^0
5
10^-1
5
(n,p)
10^-10
10^-8
10^-6
10^-4
10^-2
10^0
10^2
Incident Energy (MeV)
9
40-Zr-87

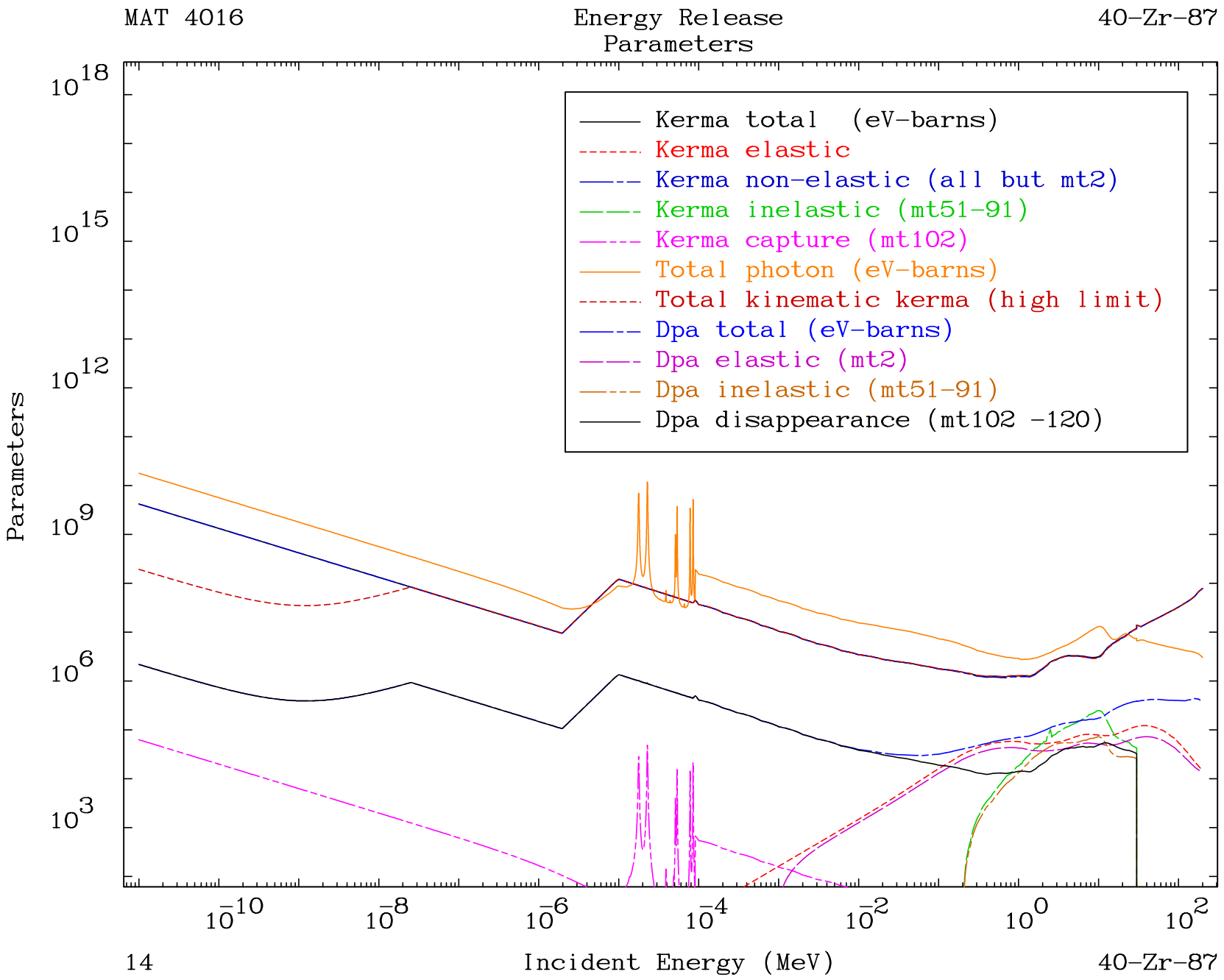

MAT 4016
(n,d) Levels
40-Zr-87
293 Kelvin Cross Sections
(n,d)
Cross Section (barns)
Incident Energy (MeV)
10
40-Zr-87

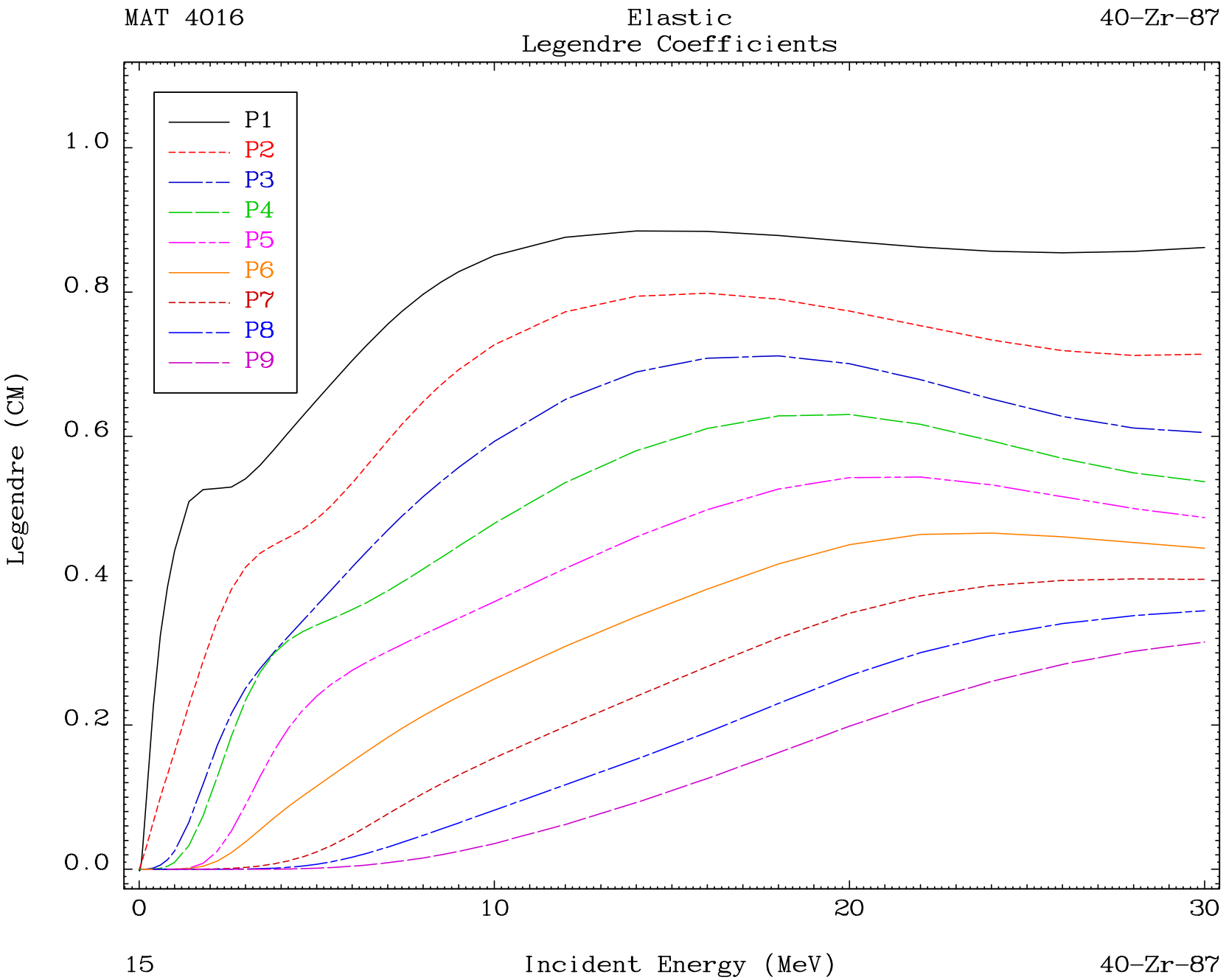

MAT 4016
(n,t) Levels
40-Zr-87
293 Kelvin Cross Sections
(n,t)
Cross Section (barns)
Incident Energy (MeV)
11
40-Zr-87

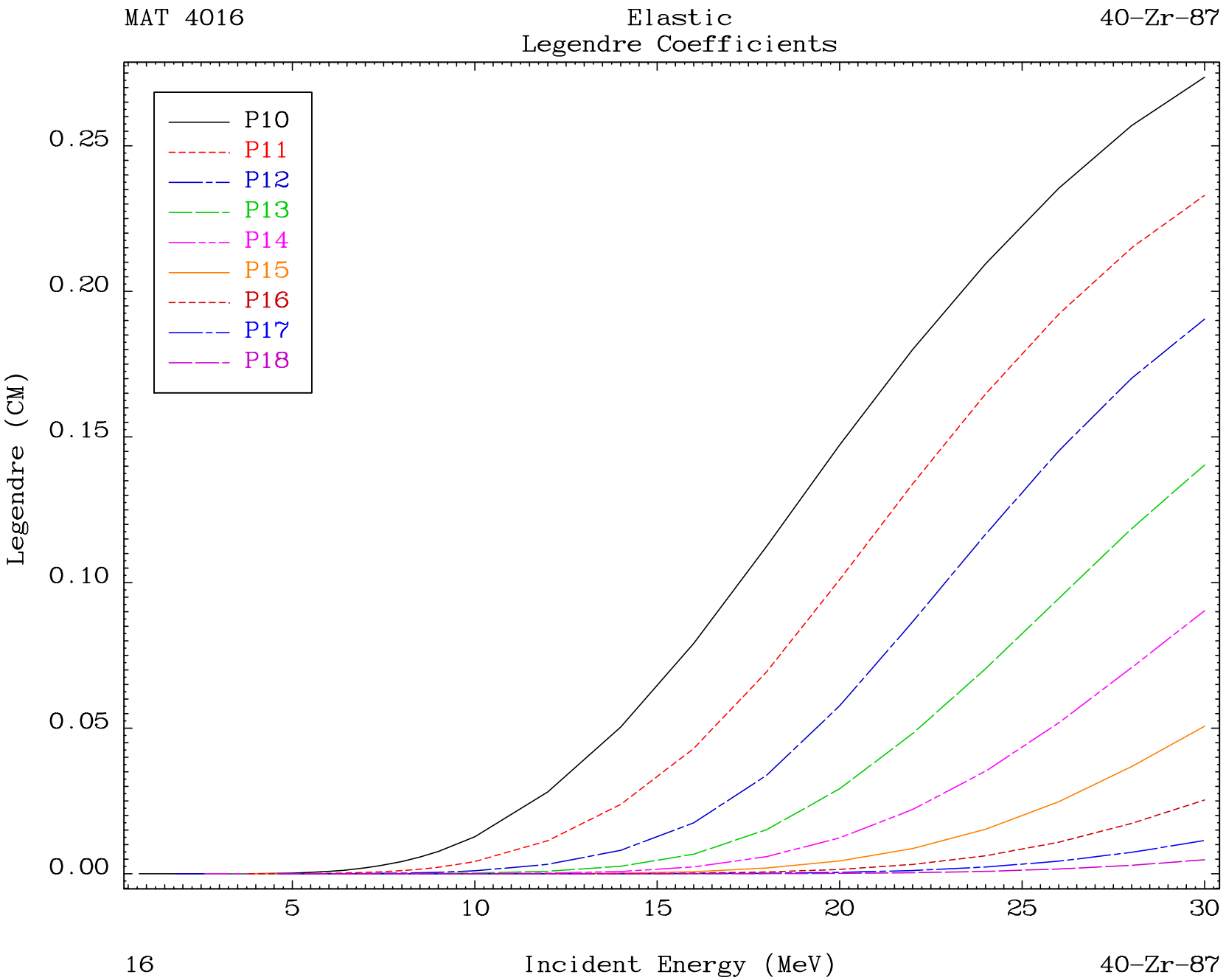

MAT 4016
(n,He3) Levels
40-Zr-87
293 Kelvin Cross Sections
(n,He-3)
Cross Section (barns)
Incident Energy (MeV)
12
40-Zr-87

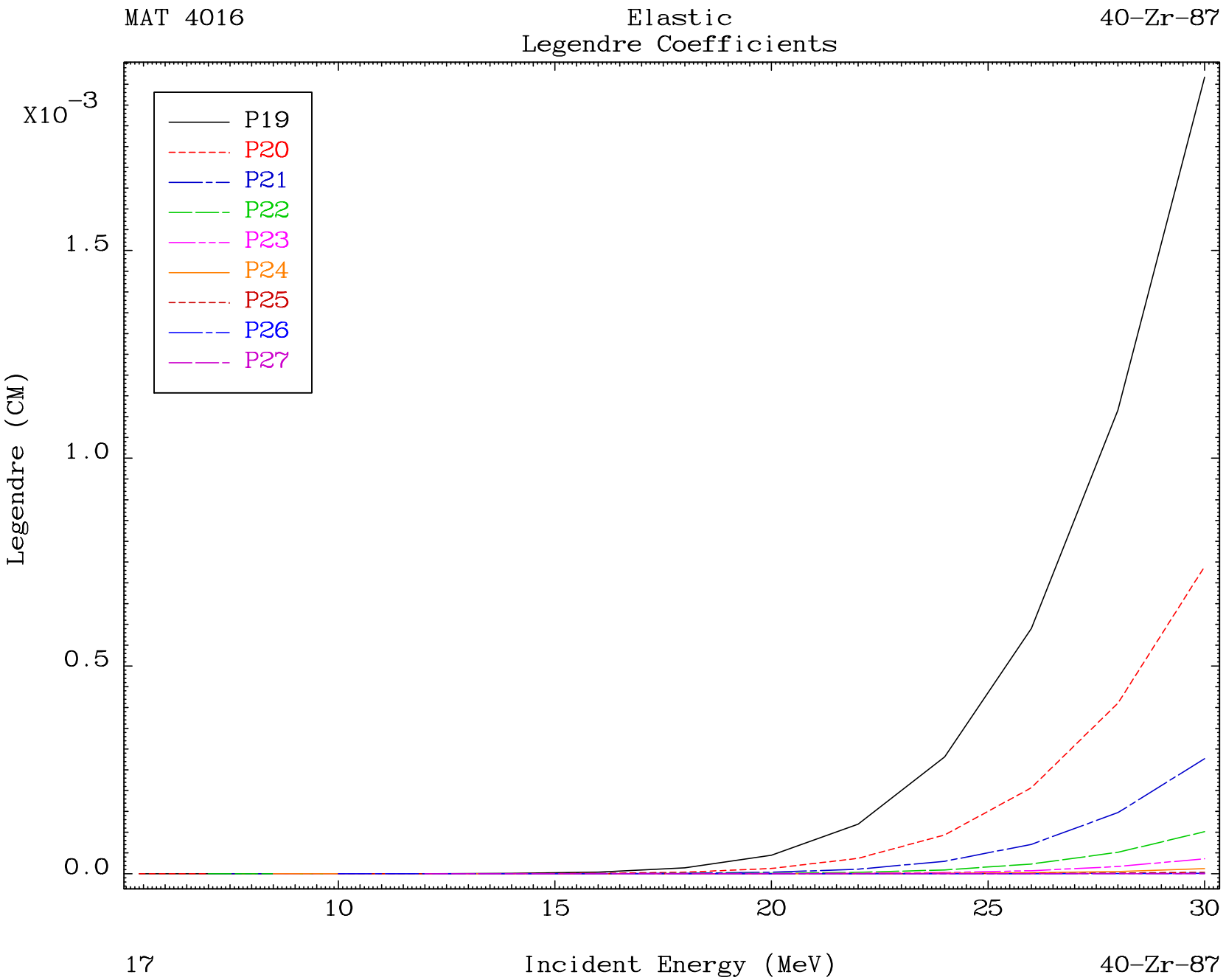
293 Kelvin Cross Sections

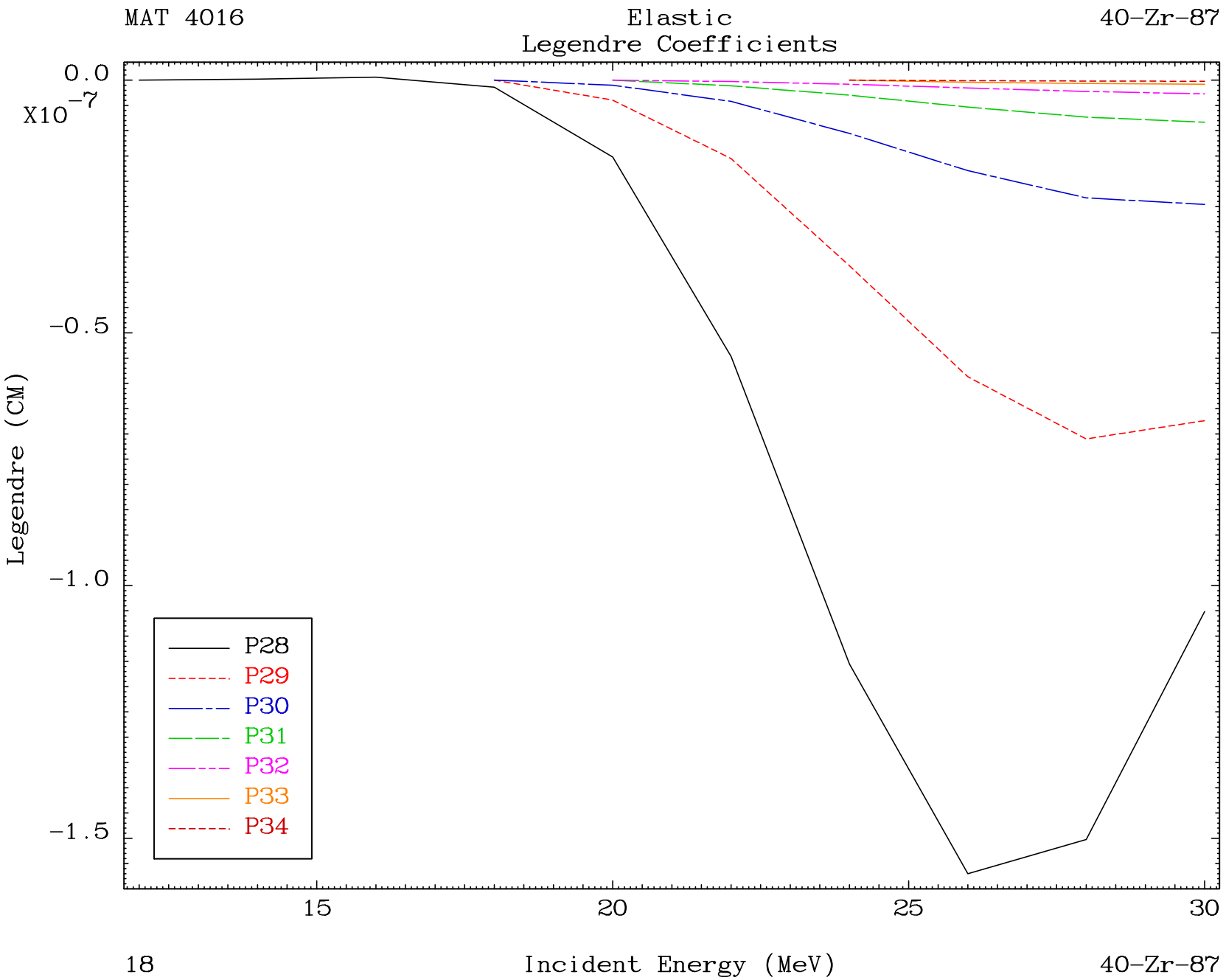


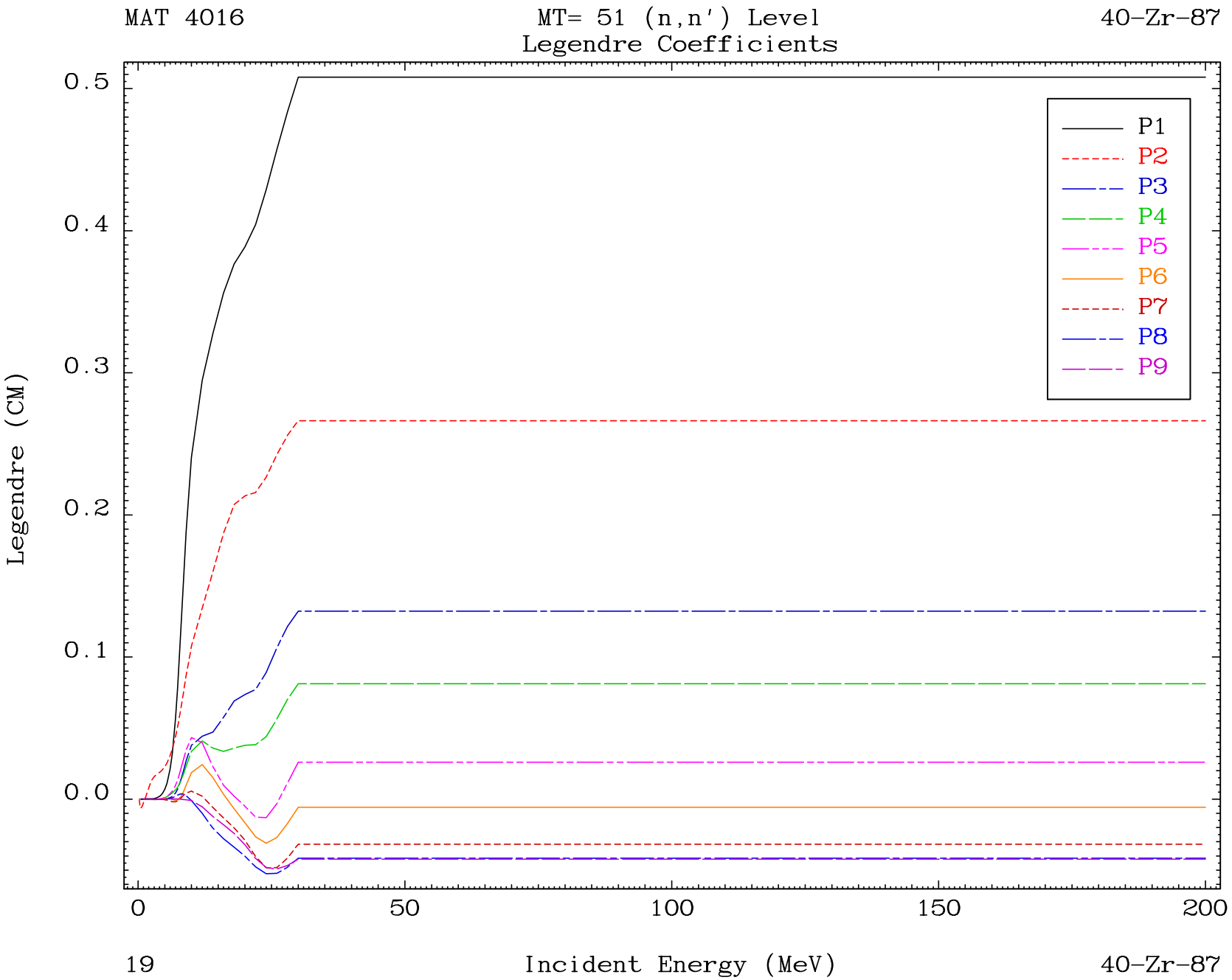

MAT 4016
Energy Release Parameters
40-Zr-87
Kerma total (eV-barns)
Kerma elastic
Kerma non-elastic (all but mt2)
Kerma inelastic (mt51-91)
Kerma capture (mt102)
Total photon (eV-barns)
Total kinematic kerma (high limit)
Dpa total (eV-barns)
Dpa elastic (mt2)
Dpa inelastic (mt51-91)
Dpa disappearance (mt102 -120)
Parameters
10^{18}
10^{15}
10^{12}
10^{9}
10^{6}
10^{3}
10^{-10}
10^{-8}
10^{-6}
10^{-4}
10^{-2}
10^{0}
10^{2}
Incident Energy (MeV)
14
40-Zr-87

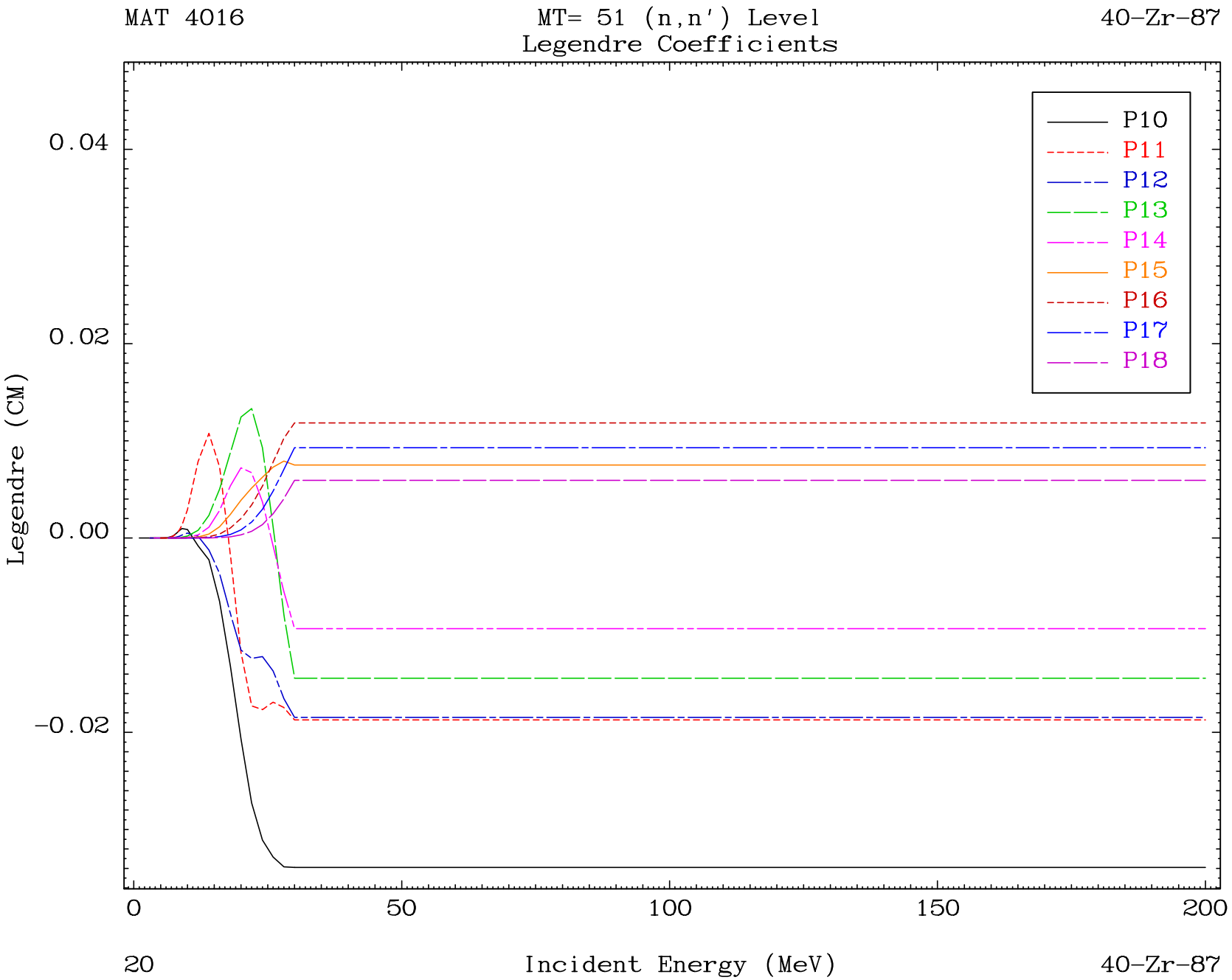

MAT 4016
Elastic
Legendre Coefficients
40-Zr-87
P1
P2
P3
P4
P5
P6
P7
P8
P9
Legendre (CM)
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
15
Incident Energy (MeV)
40-Zr-87

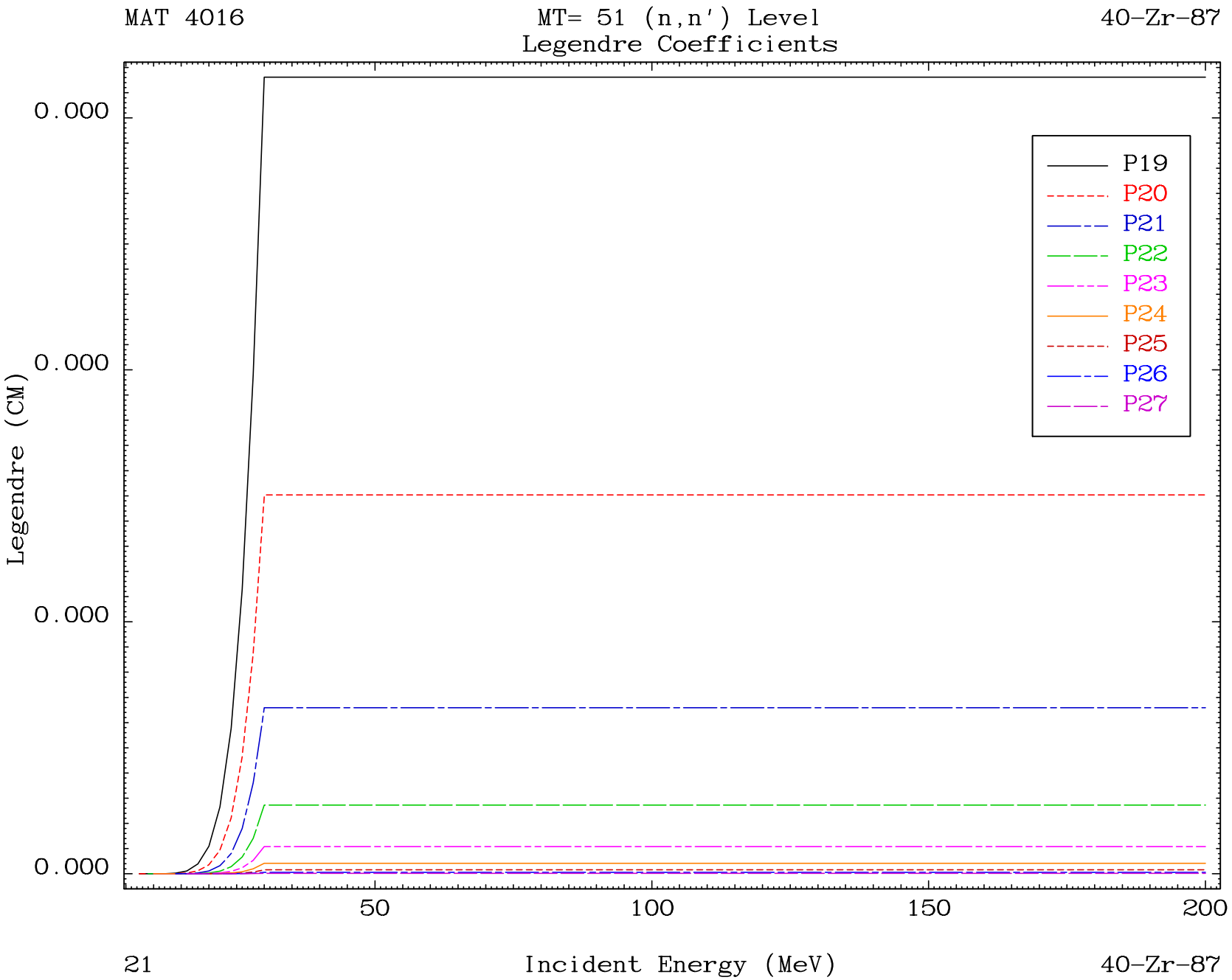

MAT 4016
Elastic
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
Legendre (CM)
0.25
0.20
0.15
0.10
0.05
0.00
5
10
15
20
25
30
16
Incident Energy (MeV)
40-Zr-87

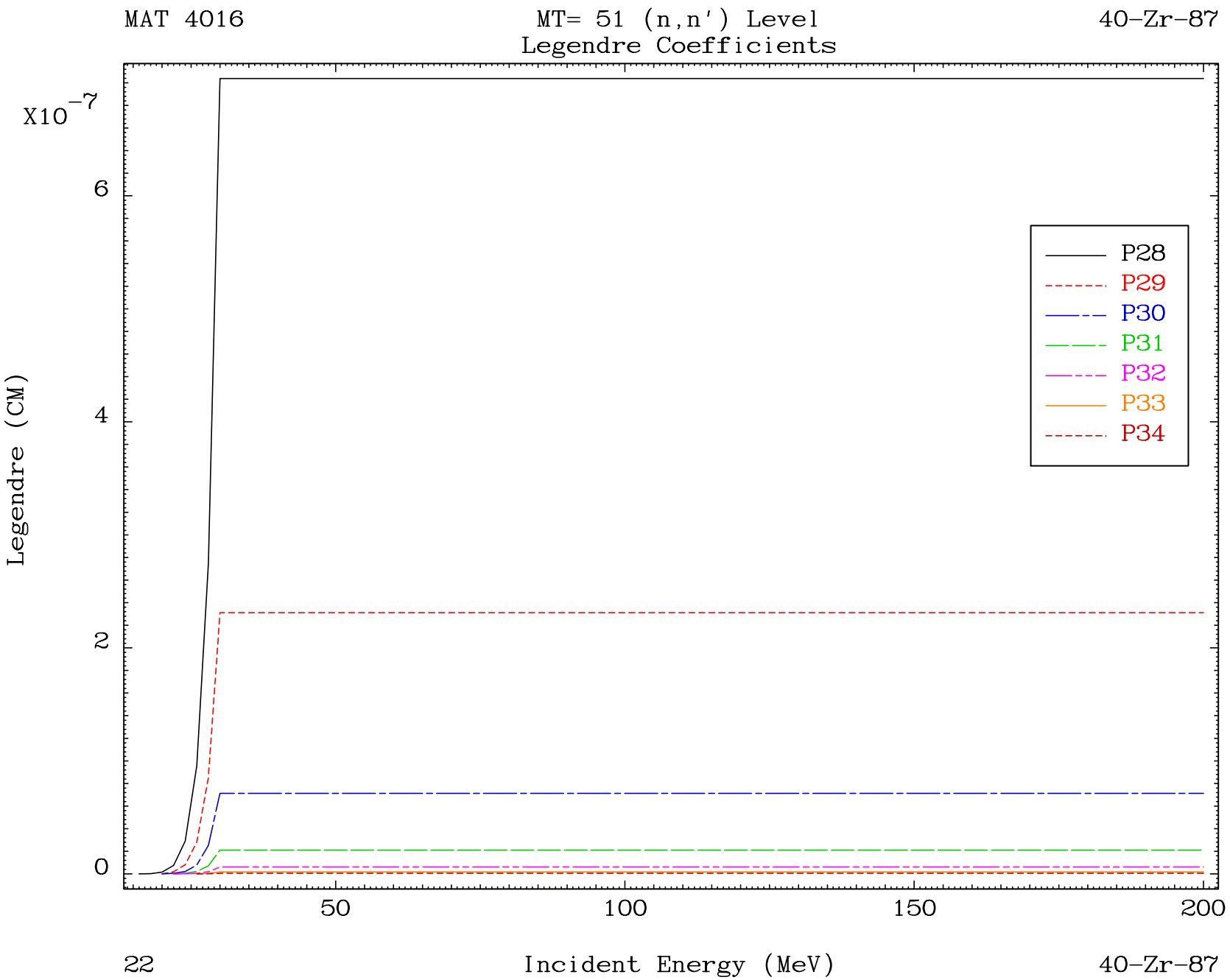

MAT 4016
Elastic
Legendre Coefficients
40-Zr-87
X10-3
1.5
1.0
0.5
0.0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
10
15
20
25
30
17
Incident Energy (MeV)
40-Zr-87

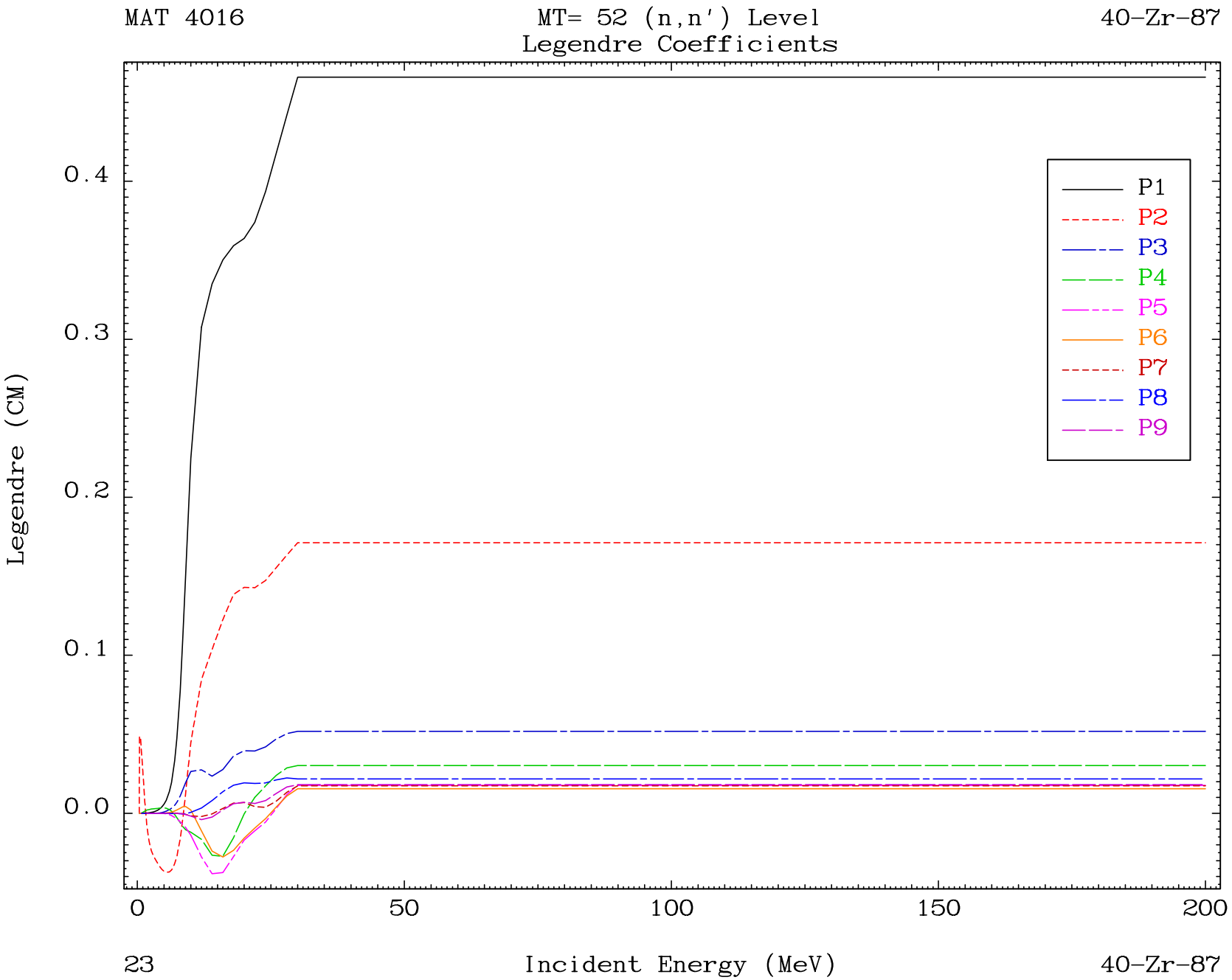

MAT 4016
Elastic
Legendre Coefficients
40-Zr-87
0.0
X10-7
-0.5
-1.0
-1.5
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
15
20
25
30
18
Incident Energy (MeV)
40-Zr-87

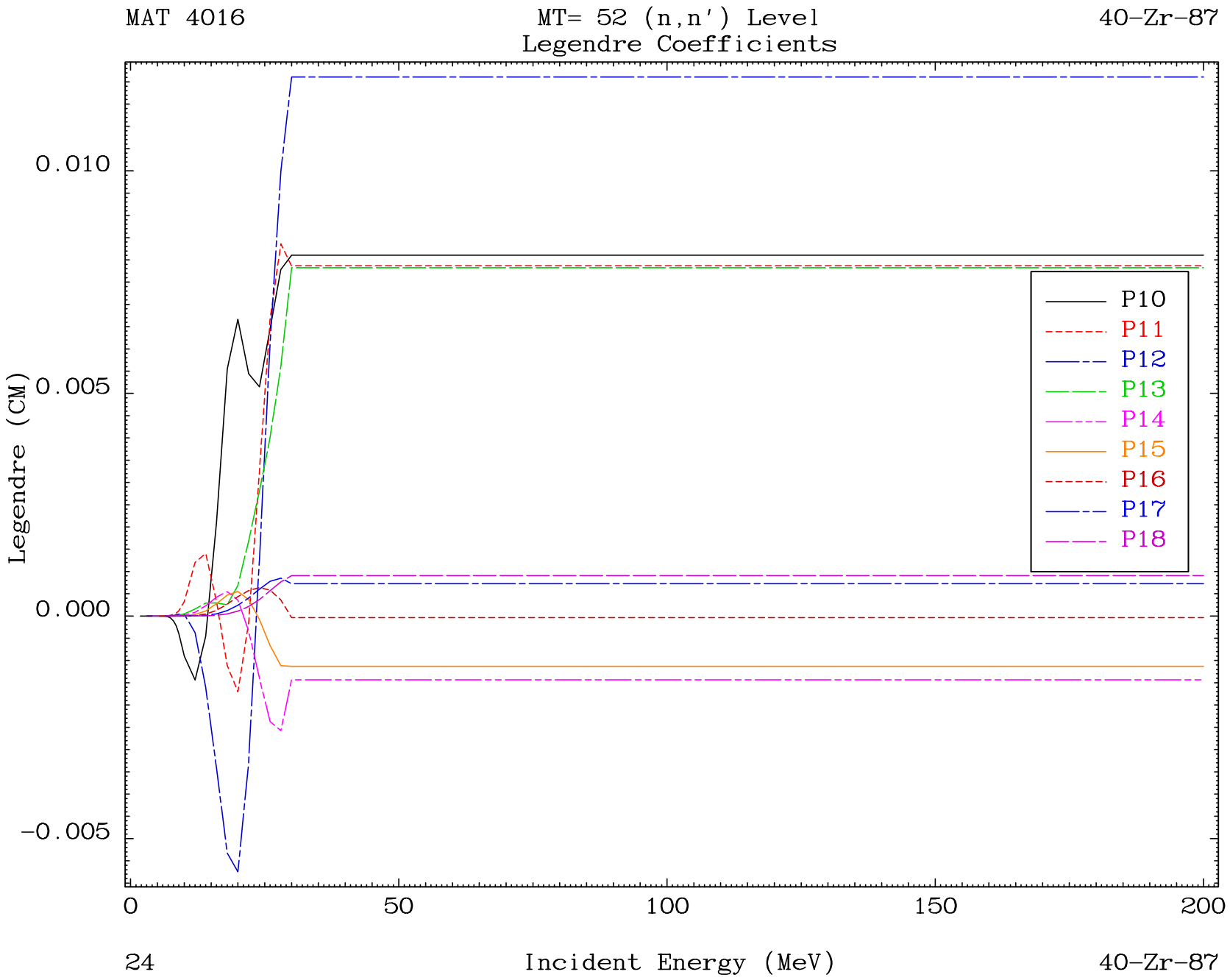

MAT 4016
MT= 51 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.5
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
P1
P2
P3
P4
P5
P6
P7
P8
P9
19
Incident Energy (MeV)
40-Zr-87

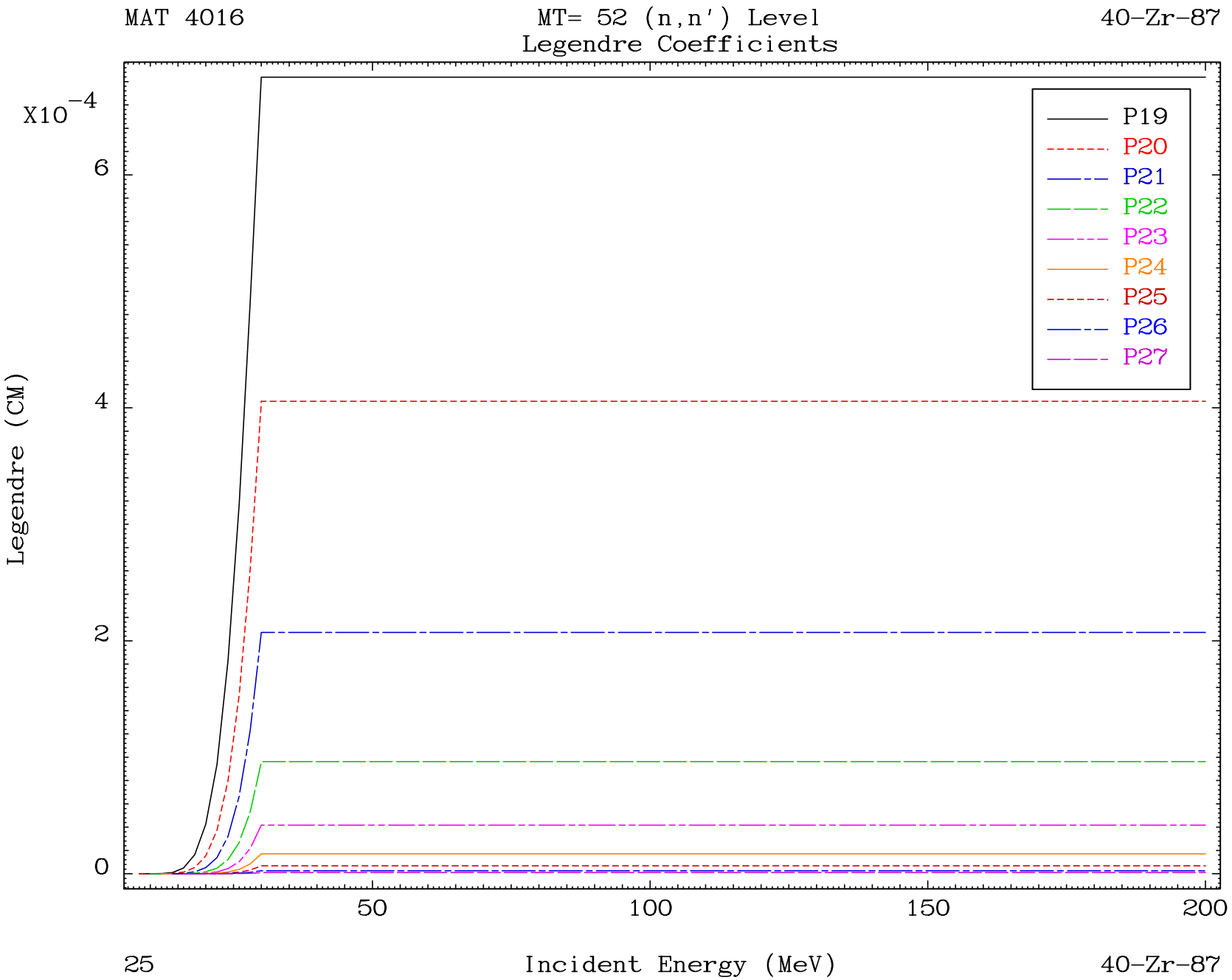

MAT 4016
MT= 51 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.04
0.02
0.00
-0.02
Legendre (CM)
0
50
100
150
200
20
Incident Energy (MeV)
40-Zr-87

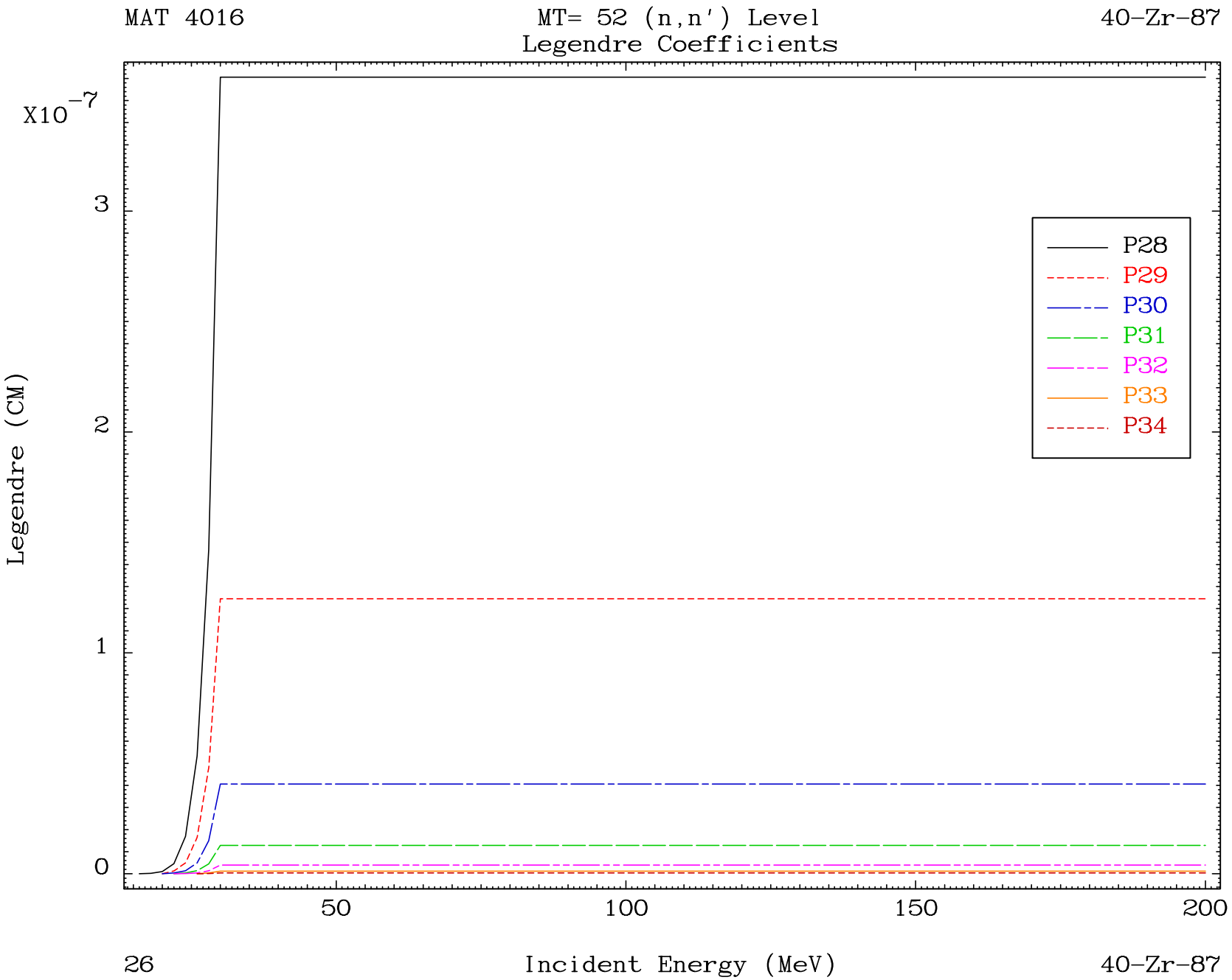

MAT 4016
MT= 51 (n,n') Level
Legendre Coefficients
40-Zr-87
0.000
0.000
0.000
0.000
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
21
Incident Energy (MeV)
40-Zr-87

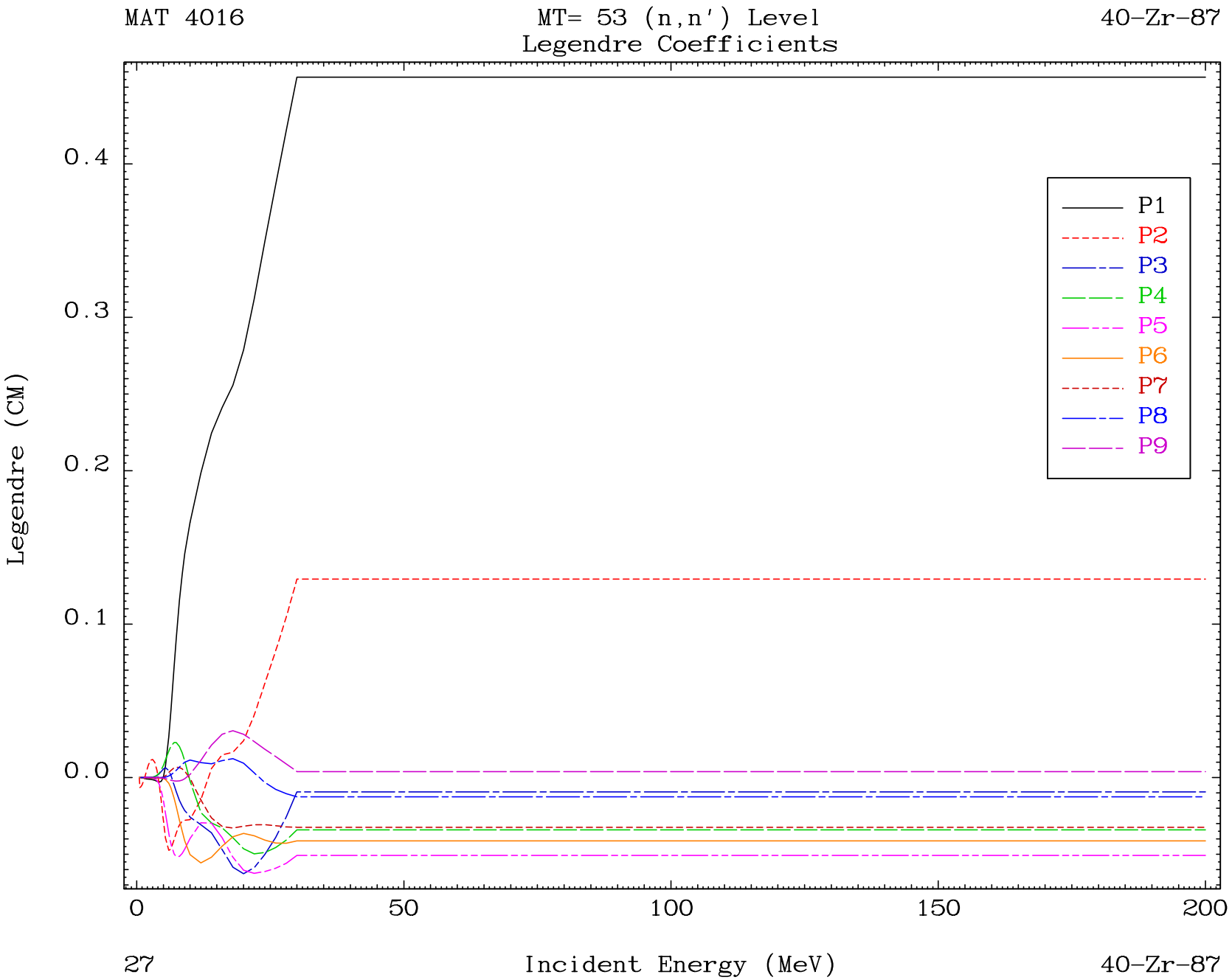

MAT 4016
MT= 51 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-7
6
4
2
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
22
Incident Energy (MeV)
40-Zr-87

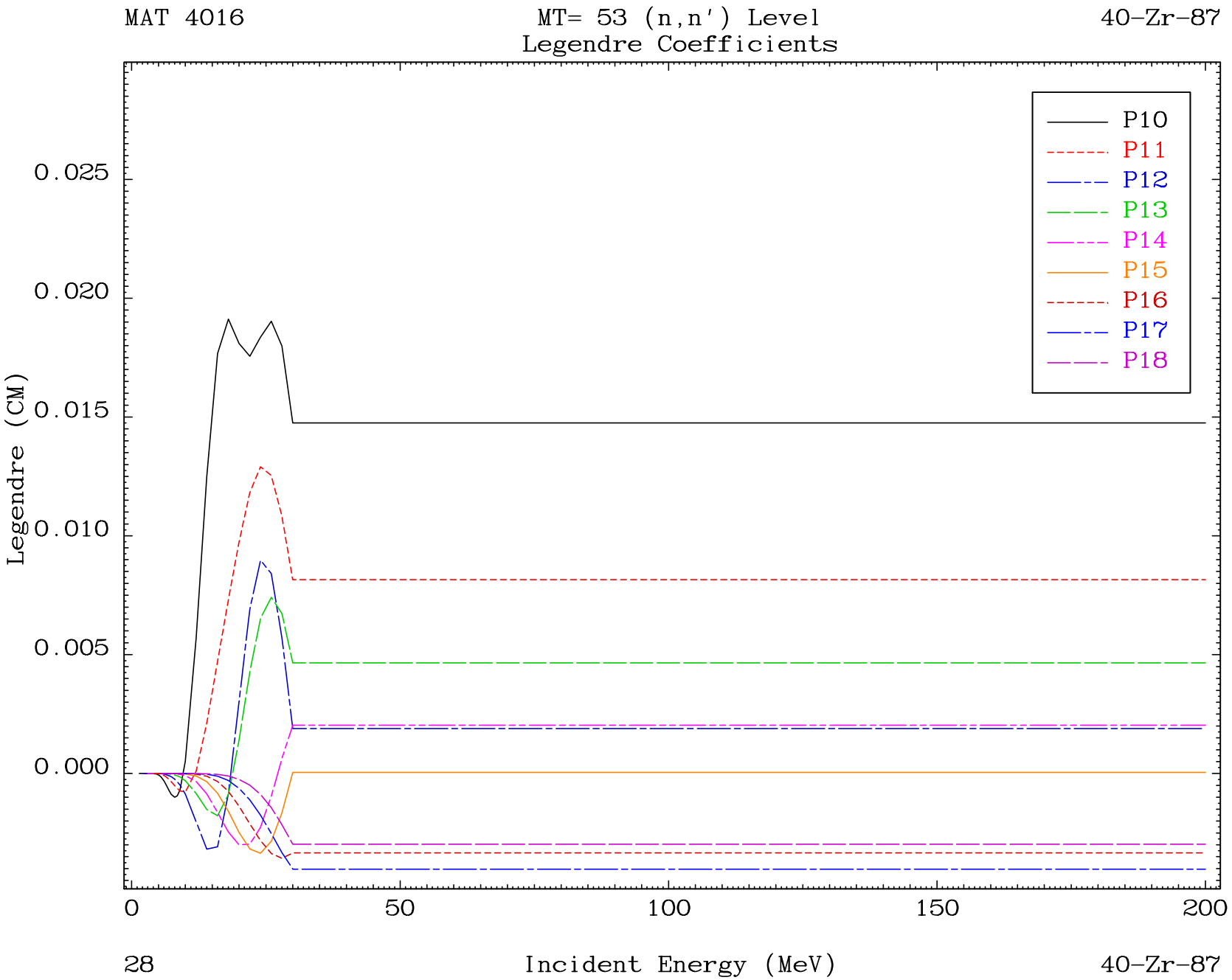

MAT 4016
MT= 52 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
P1
P2
P3
P4
P5
P6
P7
P8
P9
23
Incident Energy (MeV)
40-Zr-87

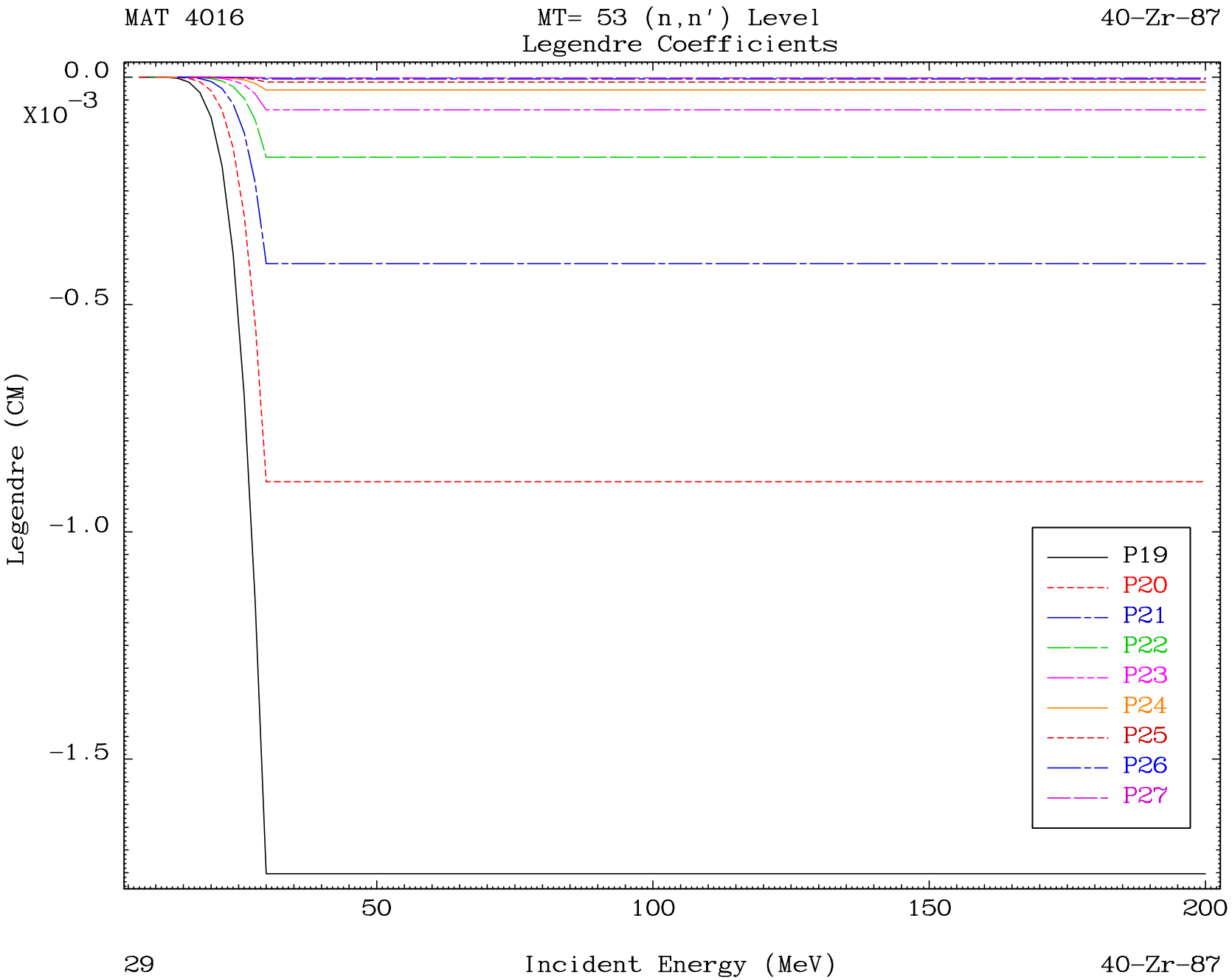

MAT 4016
MT= 52 (n,n') Level
Legendre Coefficients
40-Zr-87
0.010
0.005
0.000
-0.005
Legendre (CM)
0
50
100
150
200
24
Incident Energy (MeV)
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18

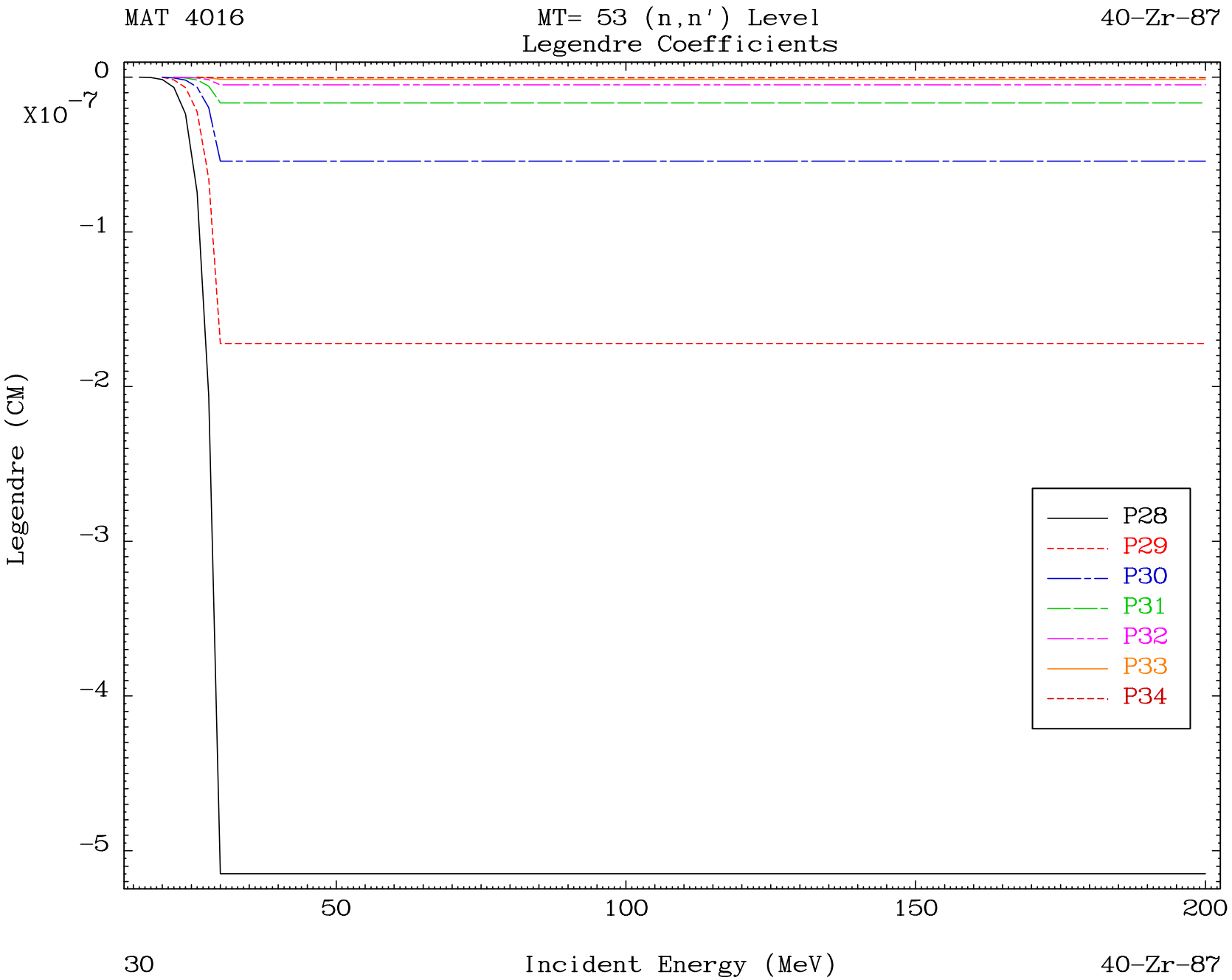

MAT 4016
MT= 52 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-4
6
4
2
0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
25
Incident Energy (MeV)
40-Zr-87

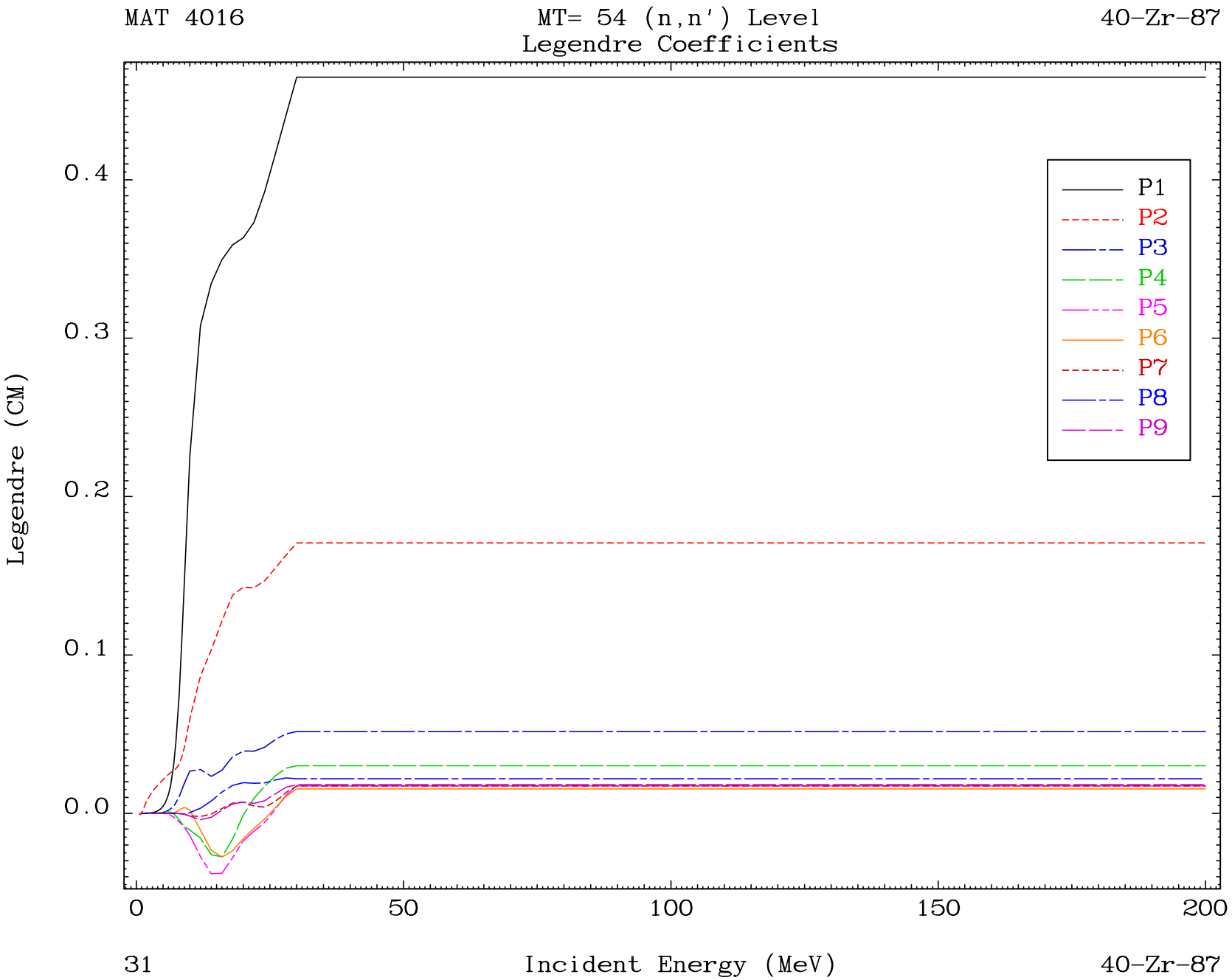

MAT 4016
MT= 52 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-7
3
2
1
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
26
Incident Energy (MeV)
40-Zr-87

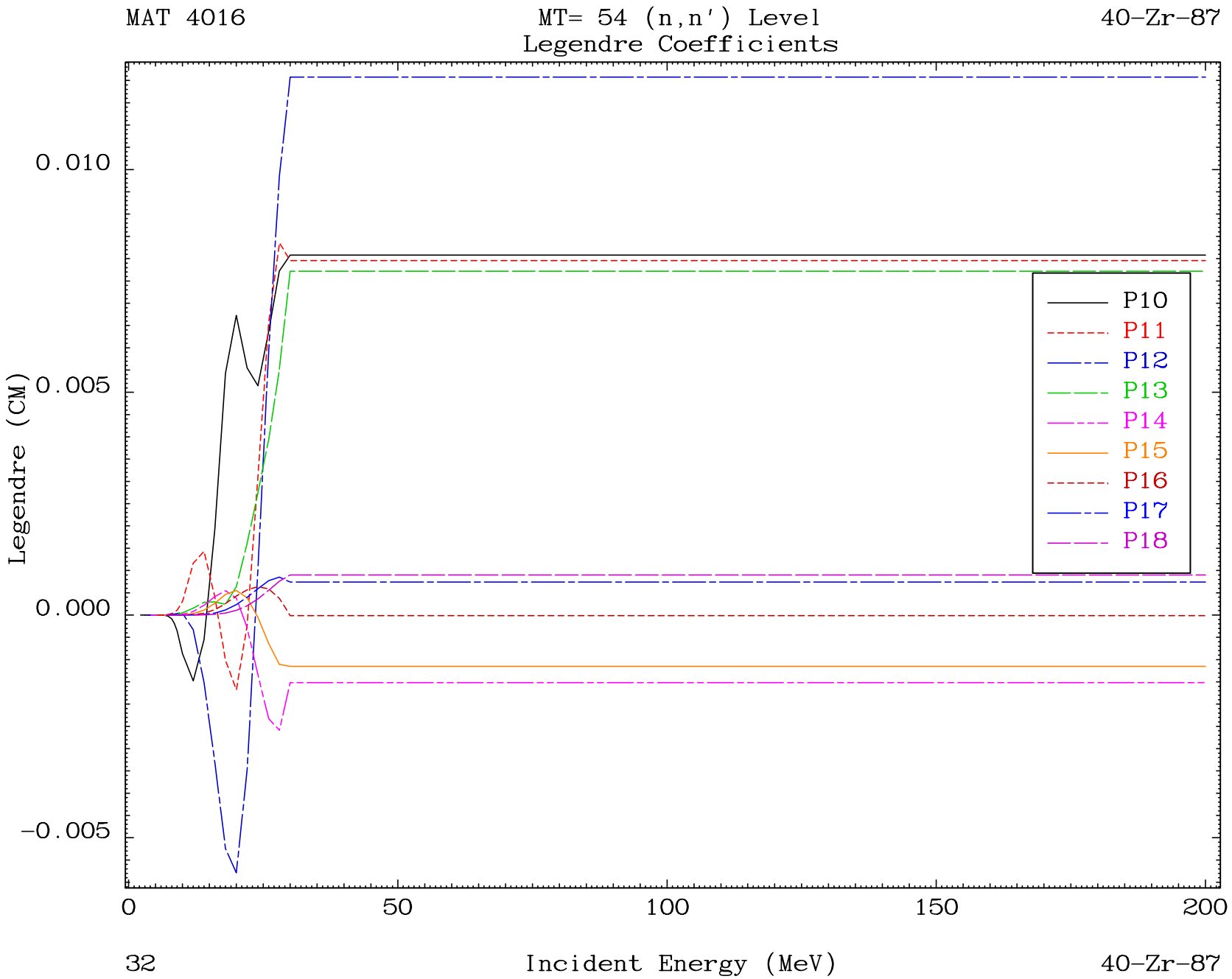

MAT 4016
MT= 53 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
P1
P2
P3
P4
P5
P6
P7
P8
P9
0
50
100
150
200
27
Incident Energy (MeV)
40-Zr-87

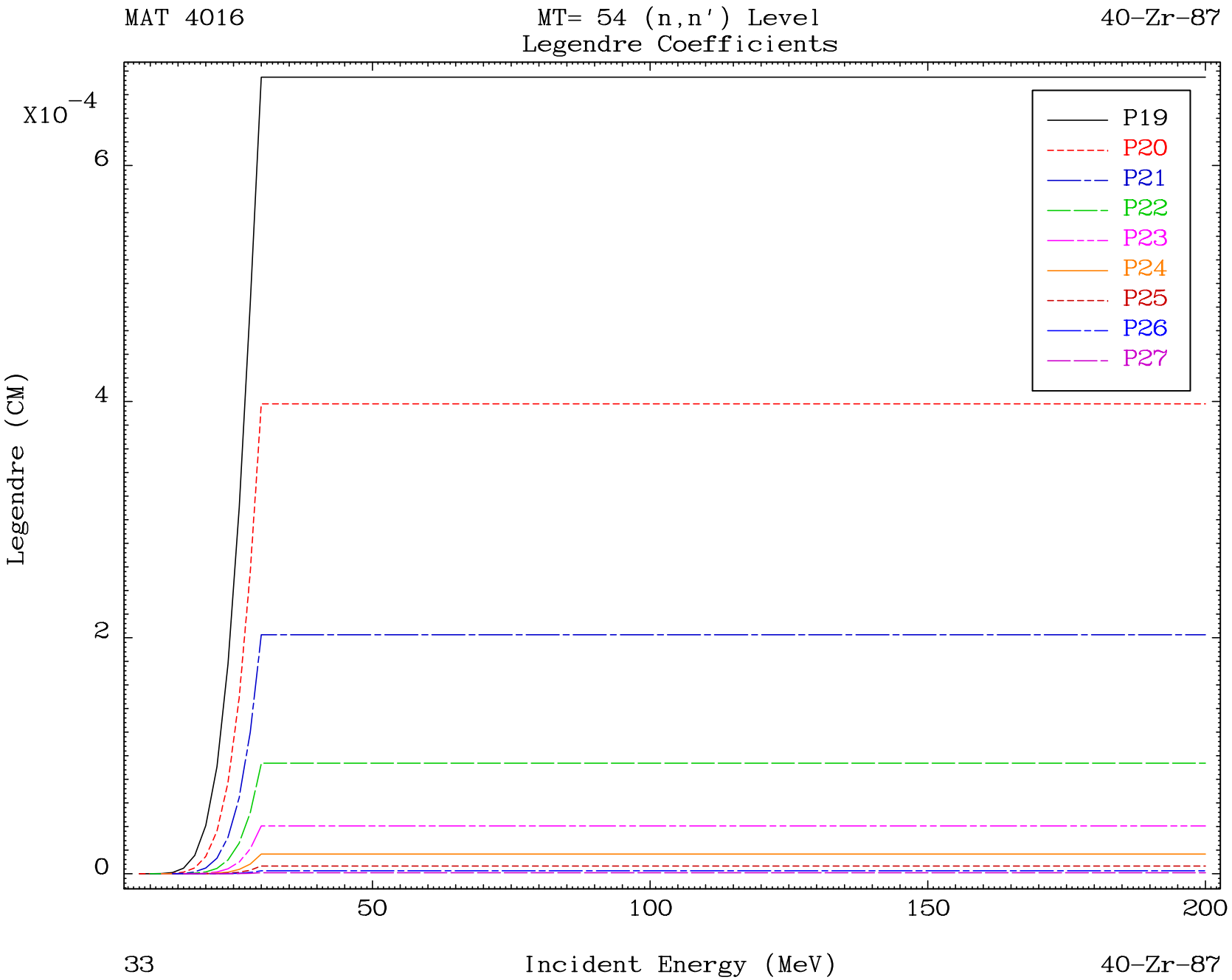

MAT 4016
MT= 53 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.025
0.020
0.015
0.010
0.005
0.000
Legendre (CM)
0
50
100
150
200
28
Incident Energy (MeV)
40-Zr-87

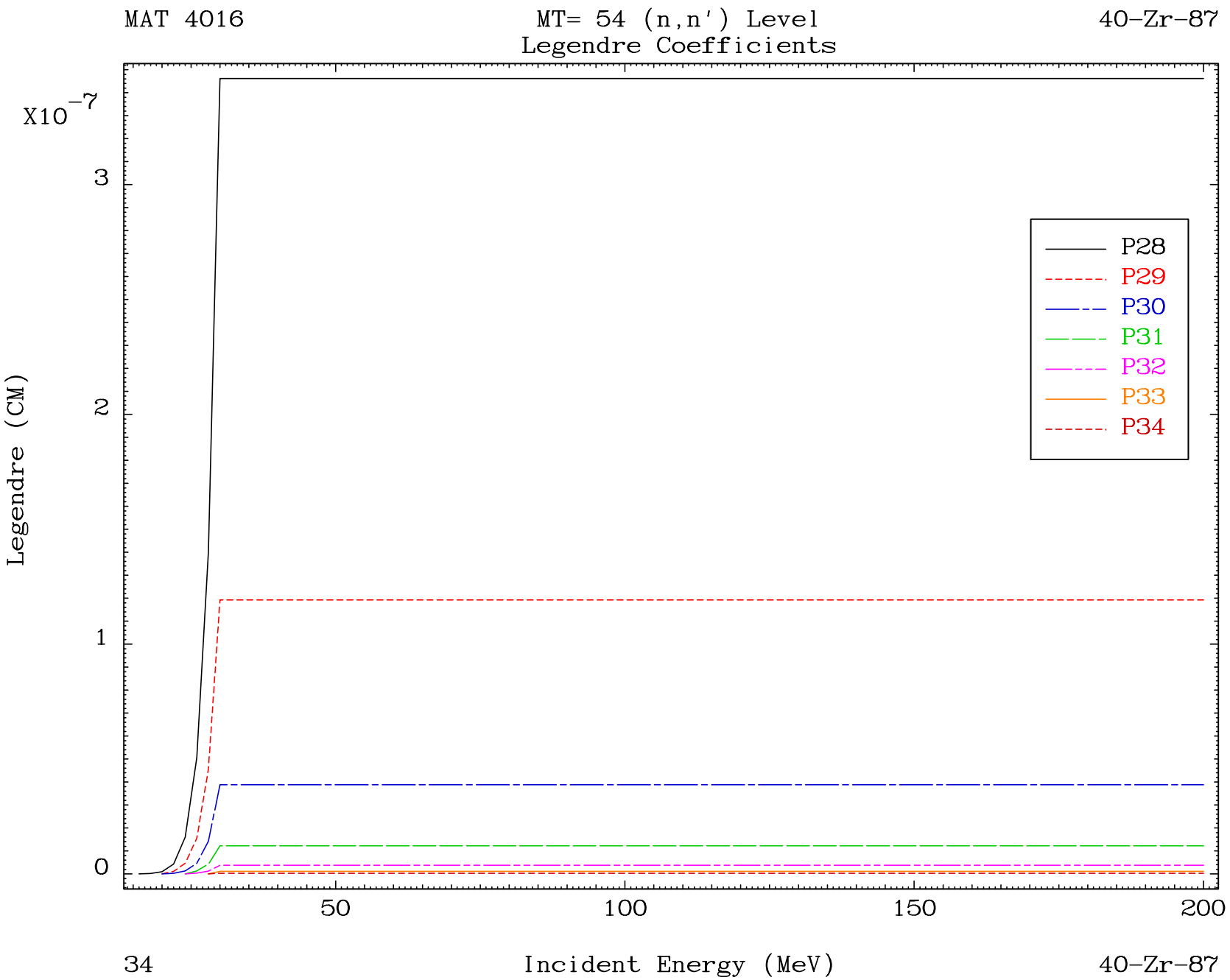

MAT 4016
MT= 53 (n,n') Level
Legendre Coefficients
40-Zr-87
0.0
X10^-3
-0.5
-1.0
-1.5
Legendre (CM)
50
100
150
200
29
Incident Energy (MeV)
40-Zr-87
P19
P20
P21
P22
P23
P24
P25
P26
P27

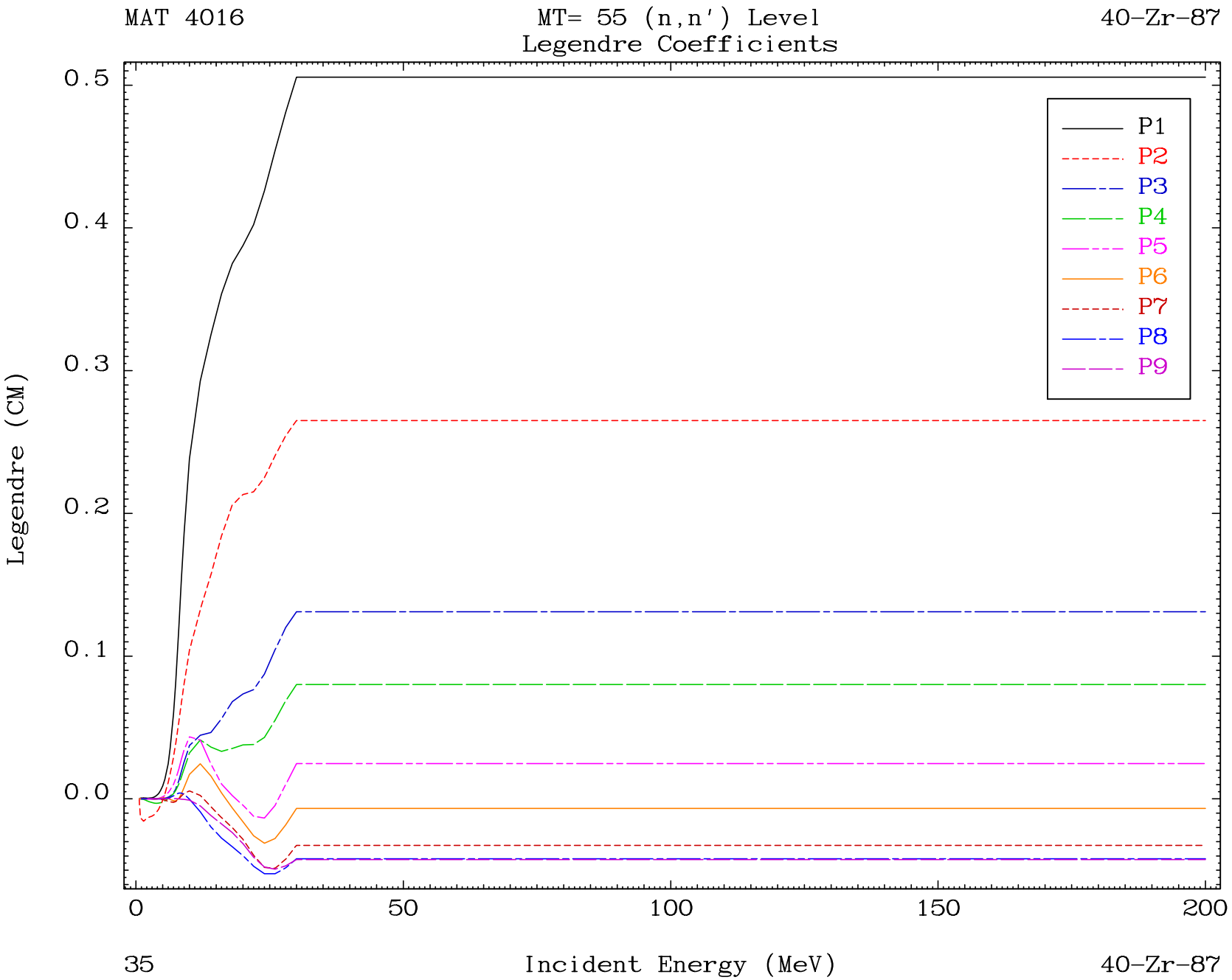

MAT 4016
MT= 53 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-7
0
-1
-2
-3
-4
-5
Legendre (CM)
50
100
150
200
30
Incident Energy (MeV)
40-Zr-87
P28
P29
P30
P31
P32
P33
P34

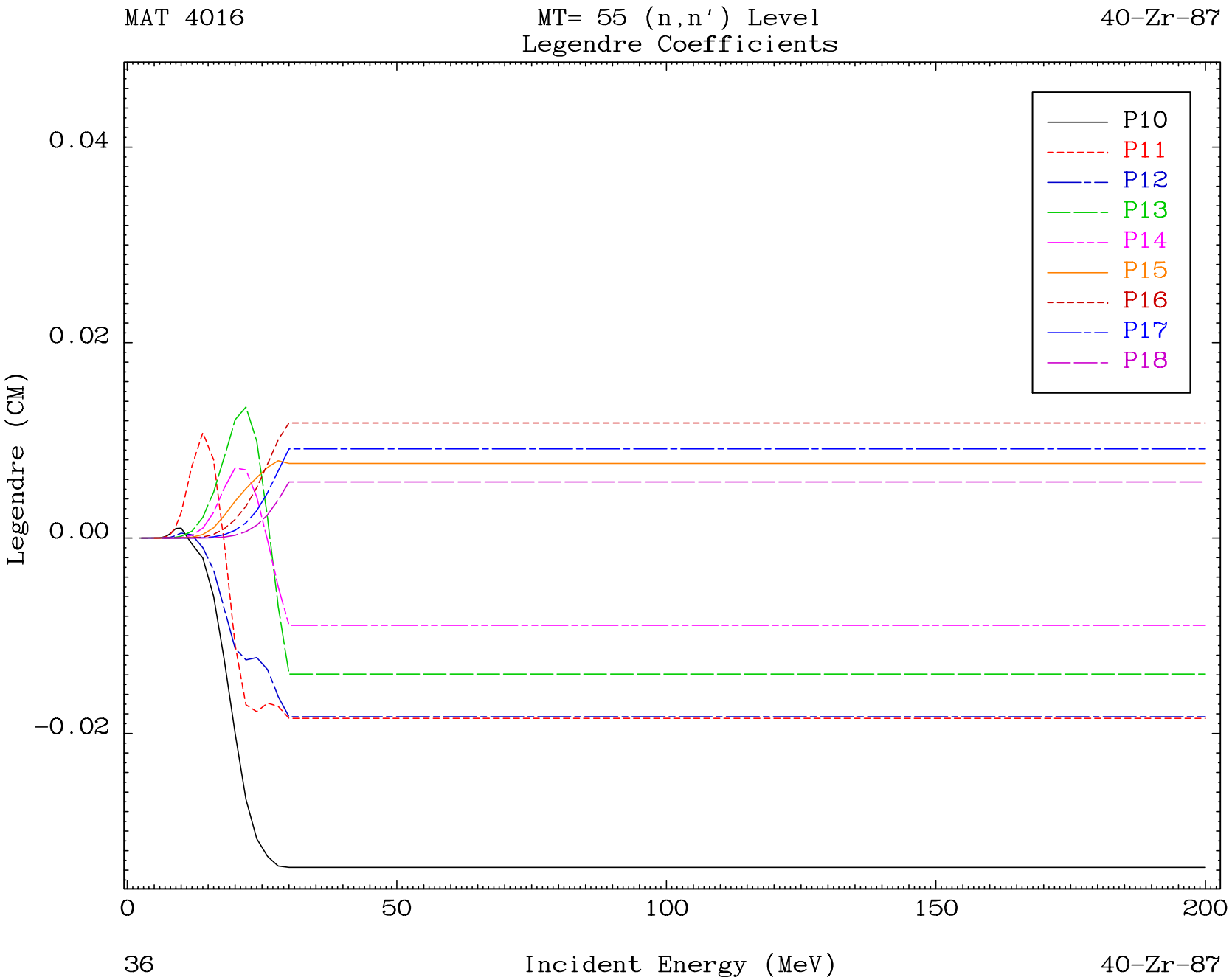

MAT 4016
MT= 54 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
P1
P2
P3
P4
P5
P6
P7
P8
P9
31
Incident Energy (MeV)
40-Zr-87

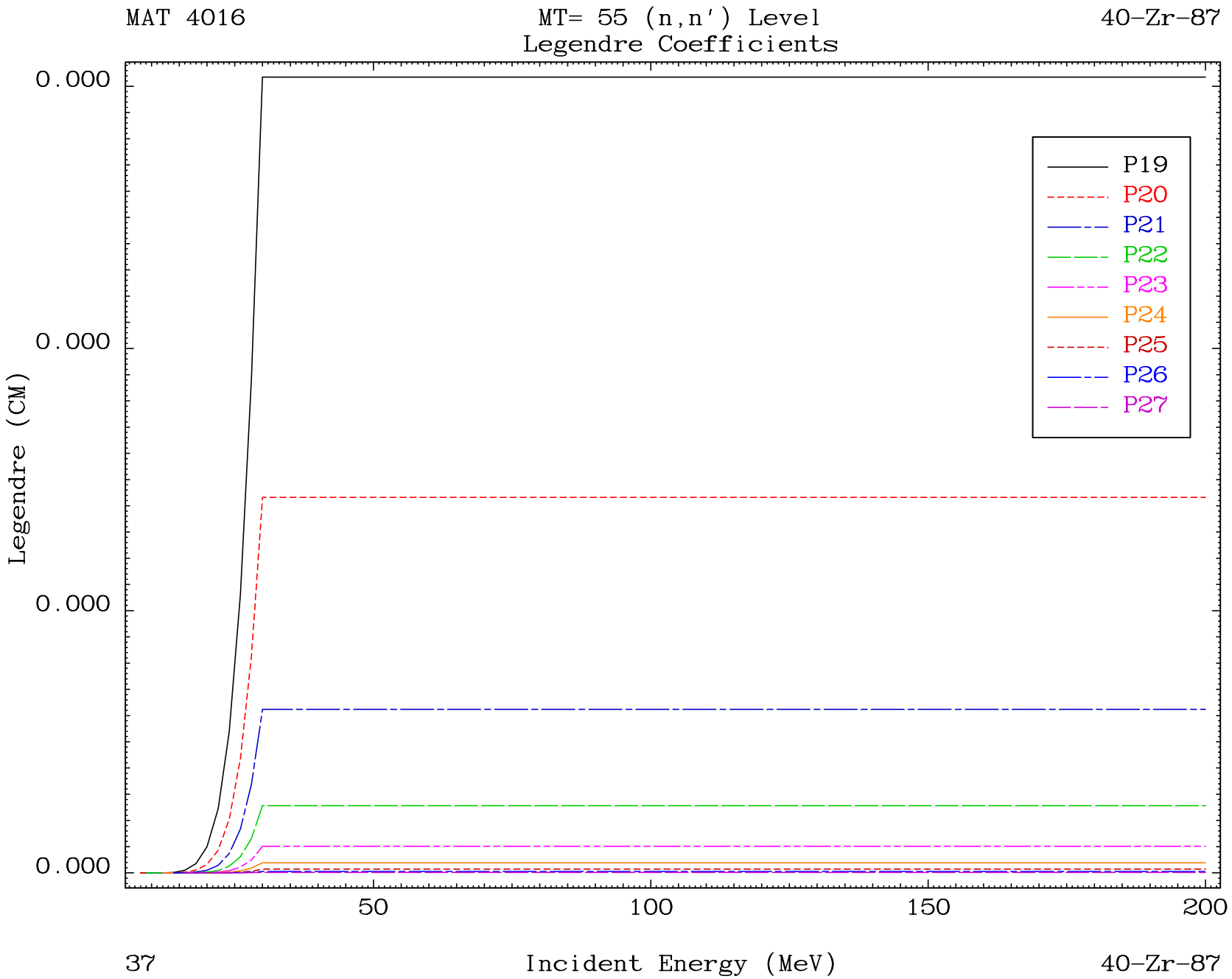

MAT 4016
MT= 54 (n,n') Level
Legendre Coefficients
40-Zr-87
0.010
0.005
0.000
-0.005
Legendre (CM)
P10
P11
P12
P13
P14
P15
P16
P17
P18
0
50
100
150
200
32
Incident Energy (MeV)
40-Zr-87

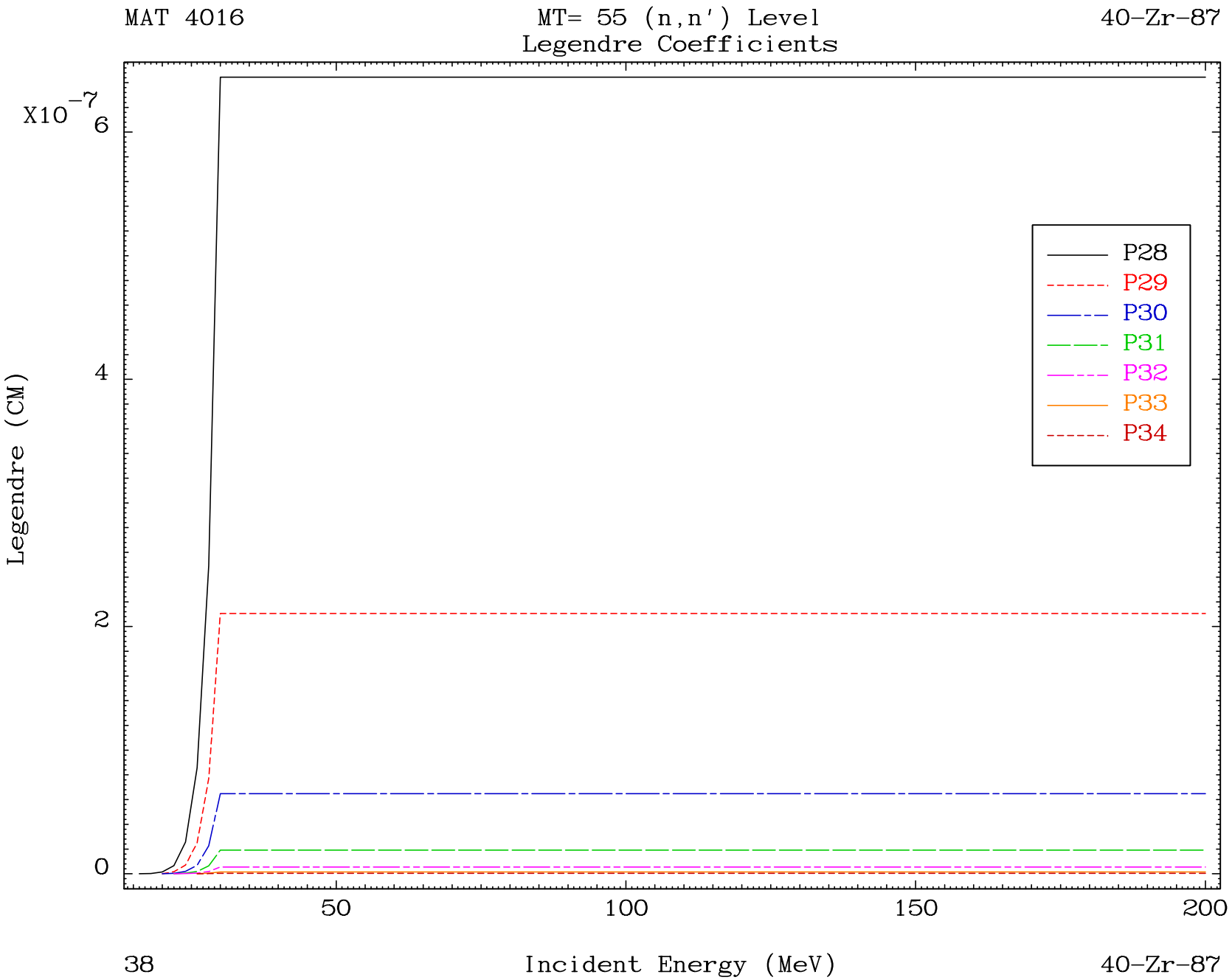

MAT 4016
MT= 54 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-4
6
4
2
0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
33
Incident Energy (MeV)
40-Zr-87

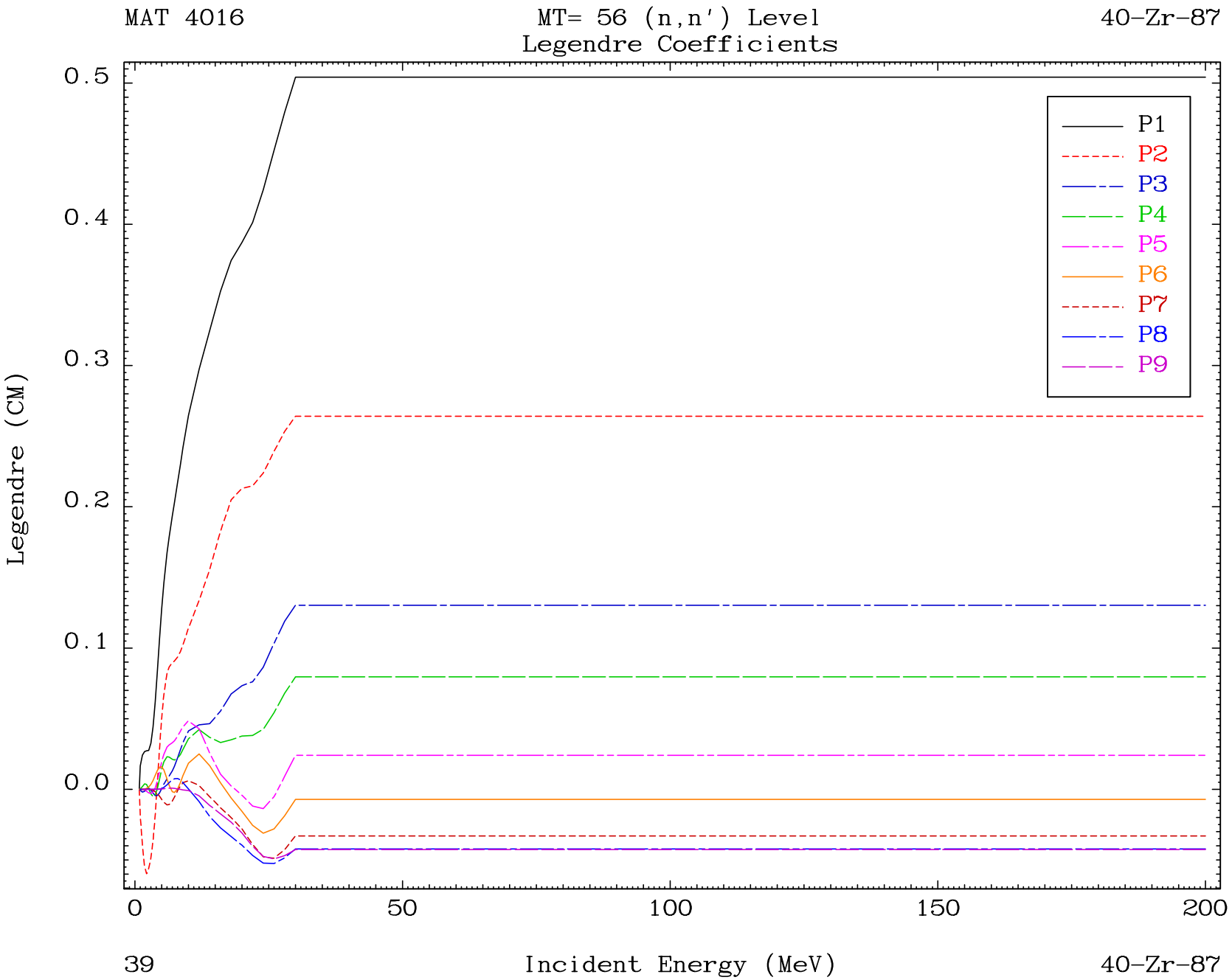

MAT 4016
MT= 54 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-7
3
2
1
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
34
Incident Energy (MeV)
40-Zr-87

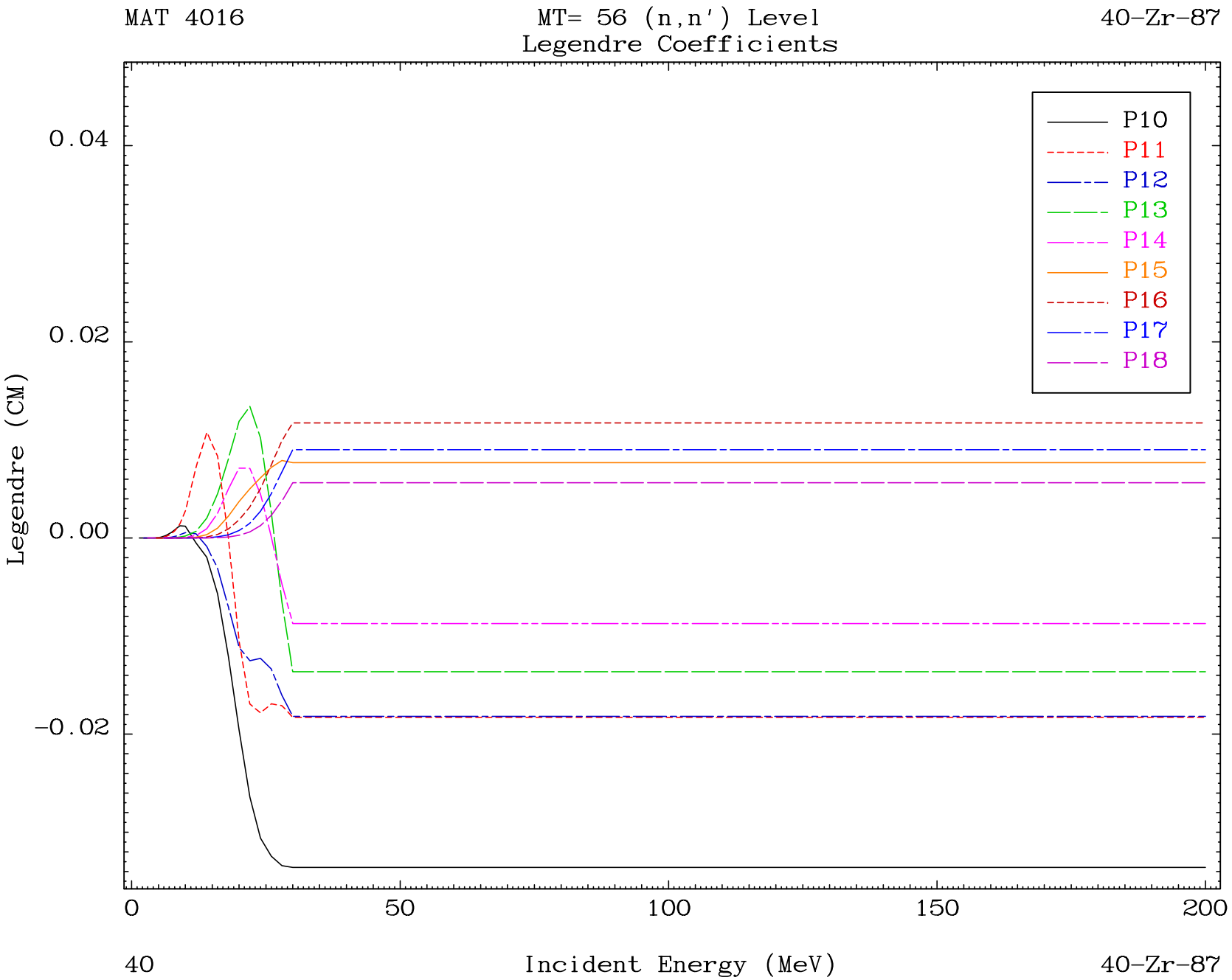

MAT 4016
MT= 55 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.5
0.4
0.3
0.2
0.1
0.0
P1
P2
P3
P4
P5
P6
P7
P8
P9
0
50
100
150
200
35
Incident Energy (MeV)
40-Zr-87

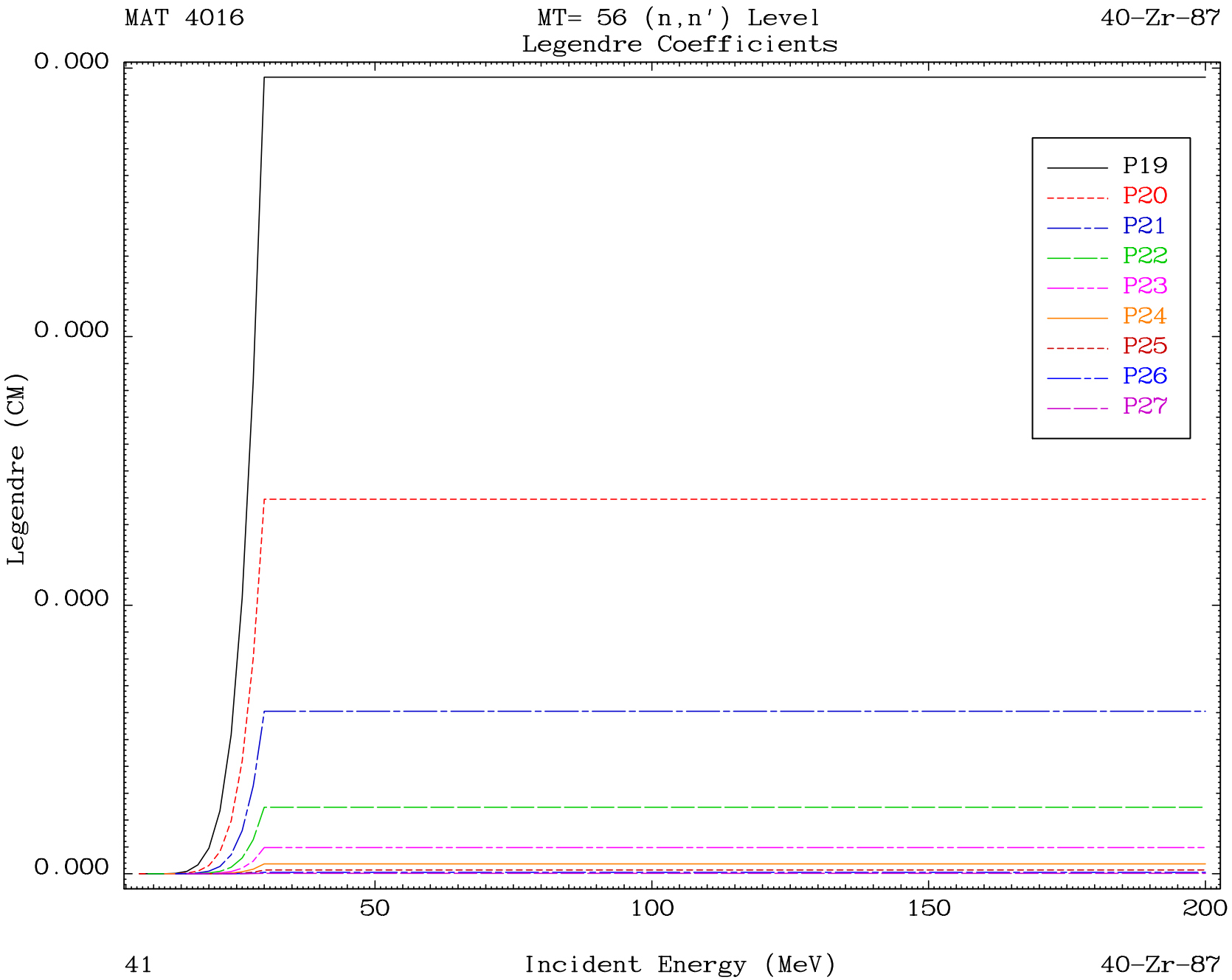

MAT 4016
MT= 55 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.04
0.02
0.00
-0.02
Legendre (CM)
0
50
100
150
200
36
Incident Energy (MeV)
40-Zr-87

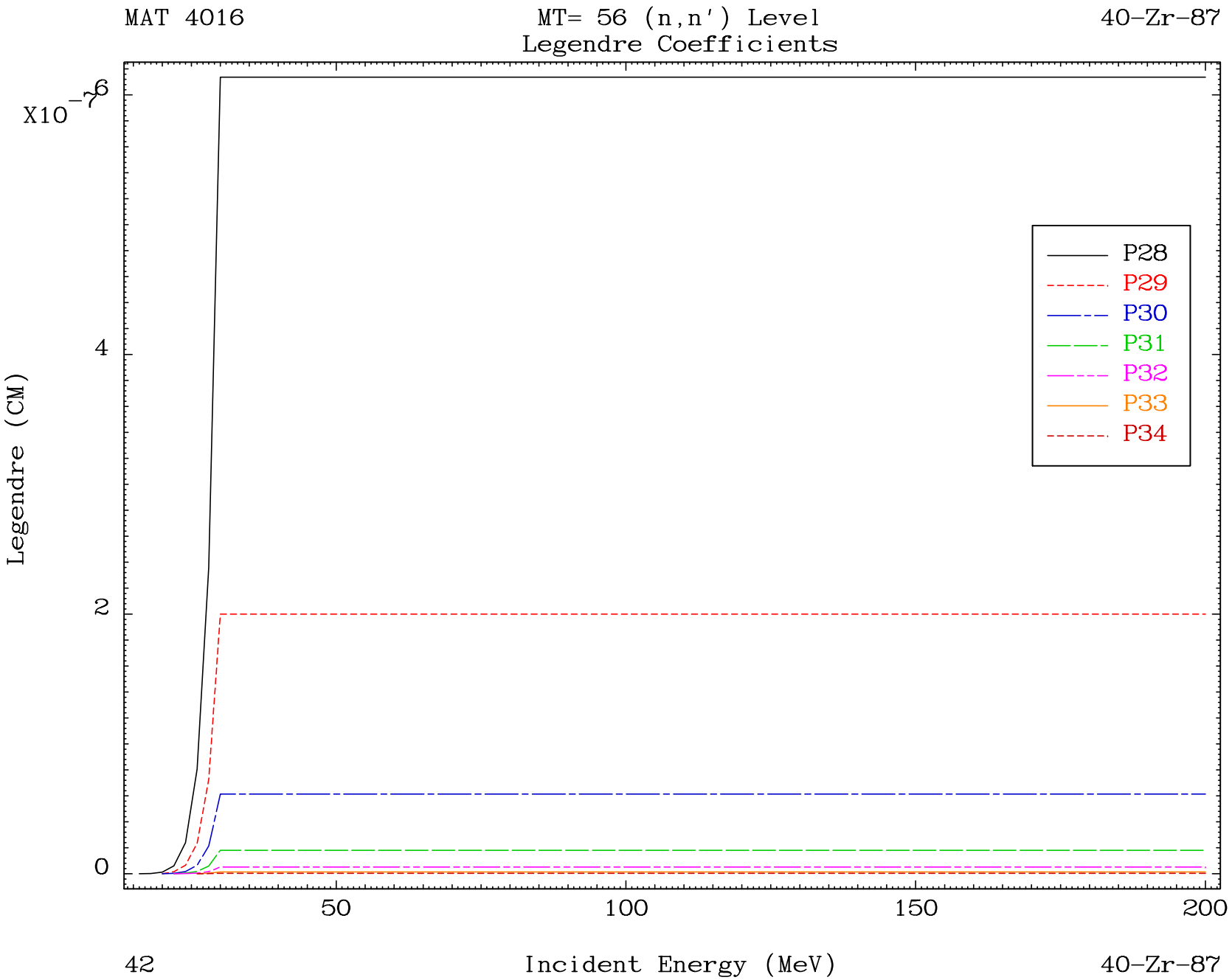

MAT 4016
MT= 55 (n,n') Level
Legendre Coefficients
40-Zr-87
0.000
0.000
0.000
0.000
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
37
Incident Energy (MeV)
40-Zr-87

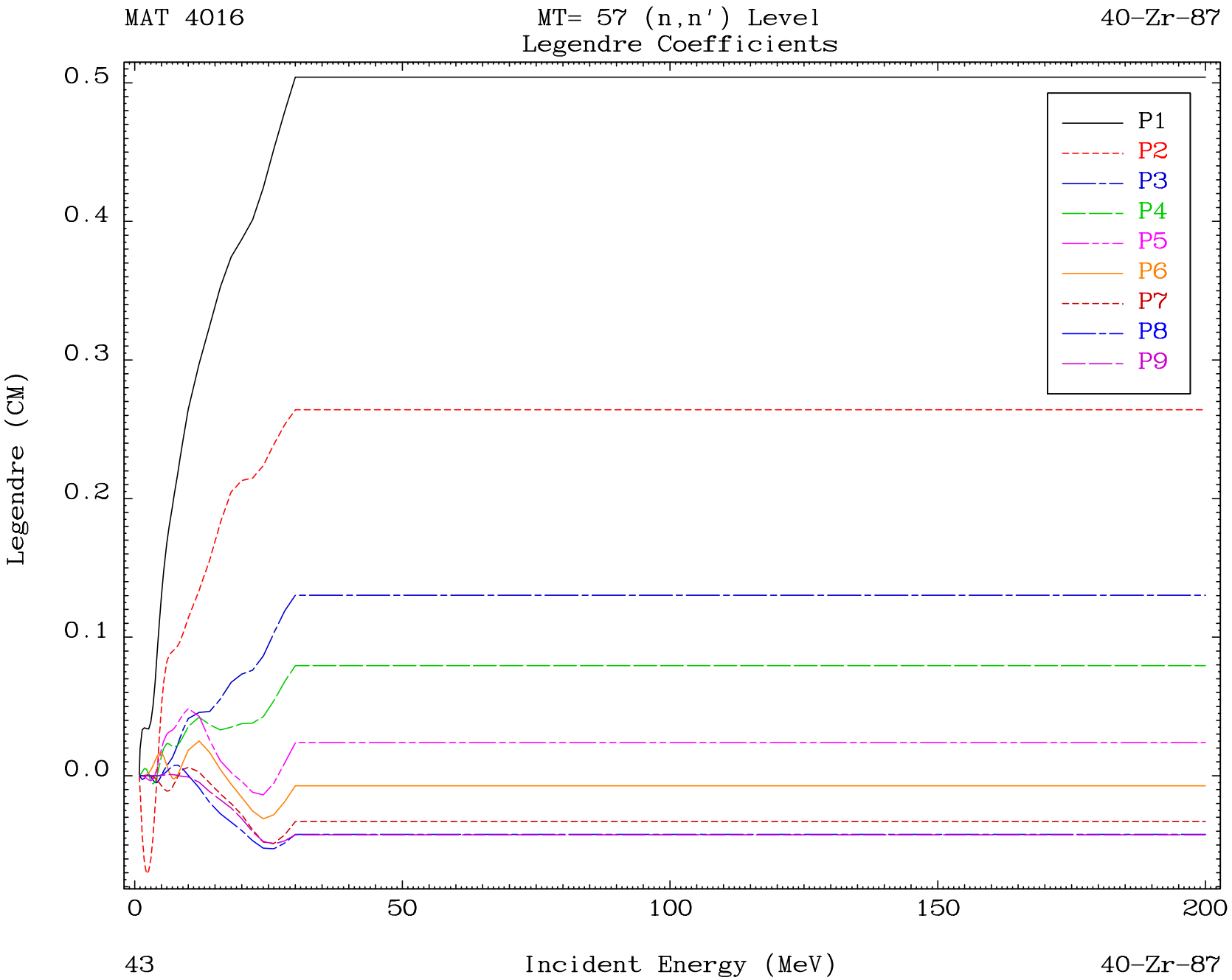

MAT 4016
MT= 55 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-7
6
4
2
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
38
Incident Energy (MeV)
40-Zr-87

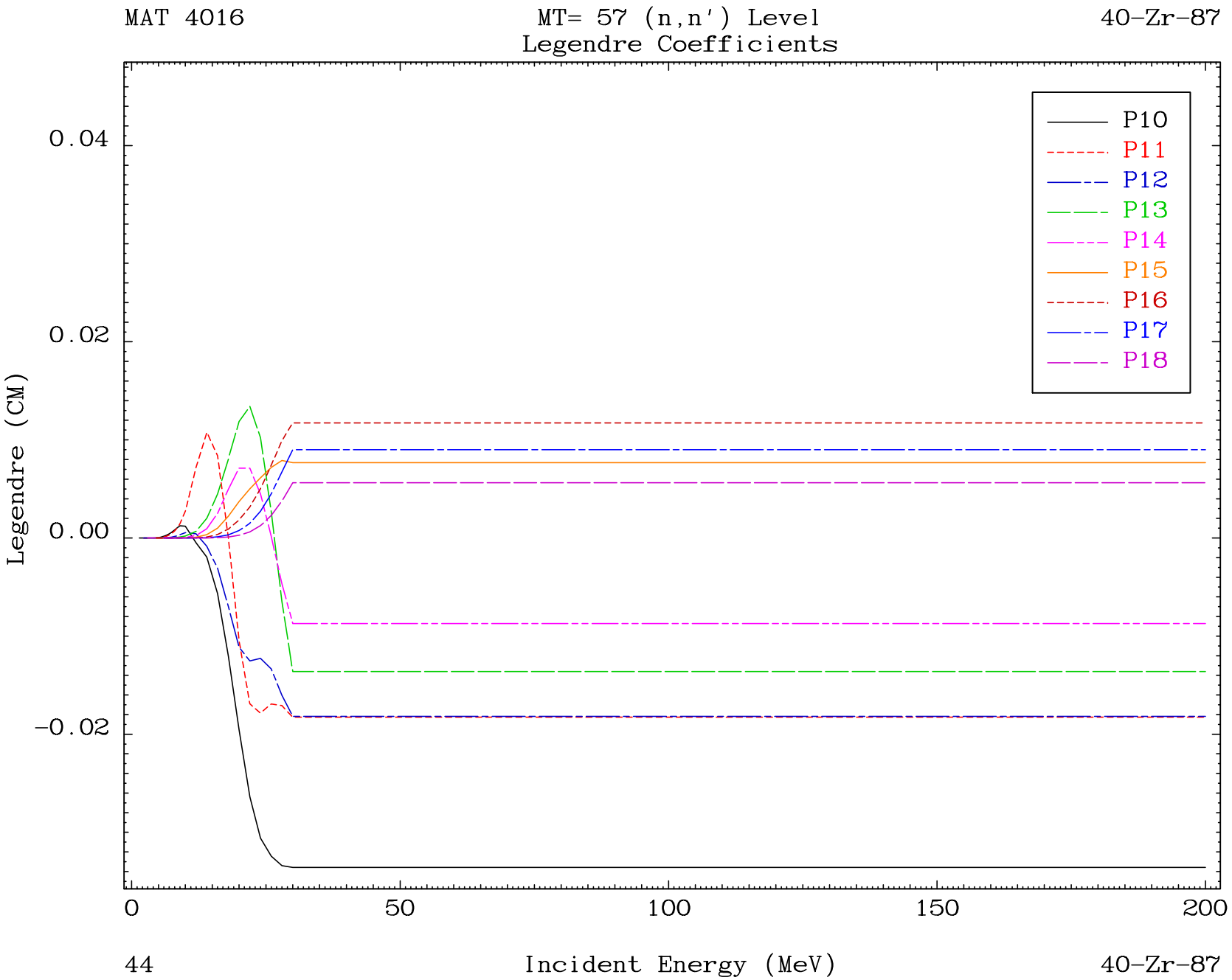

MAT 4016
MT= 56 (n,n') Level
Legendre Coefficients
40-Zr-87
0.5
0.4
0.3
0.2
0.1
0.0
Legendre (CM)
P1
P2
P3
P4
P5
P6
P7
P8
P9
0
50
100
150
200
39
Incident Energy (MeV)
40-Zr-87

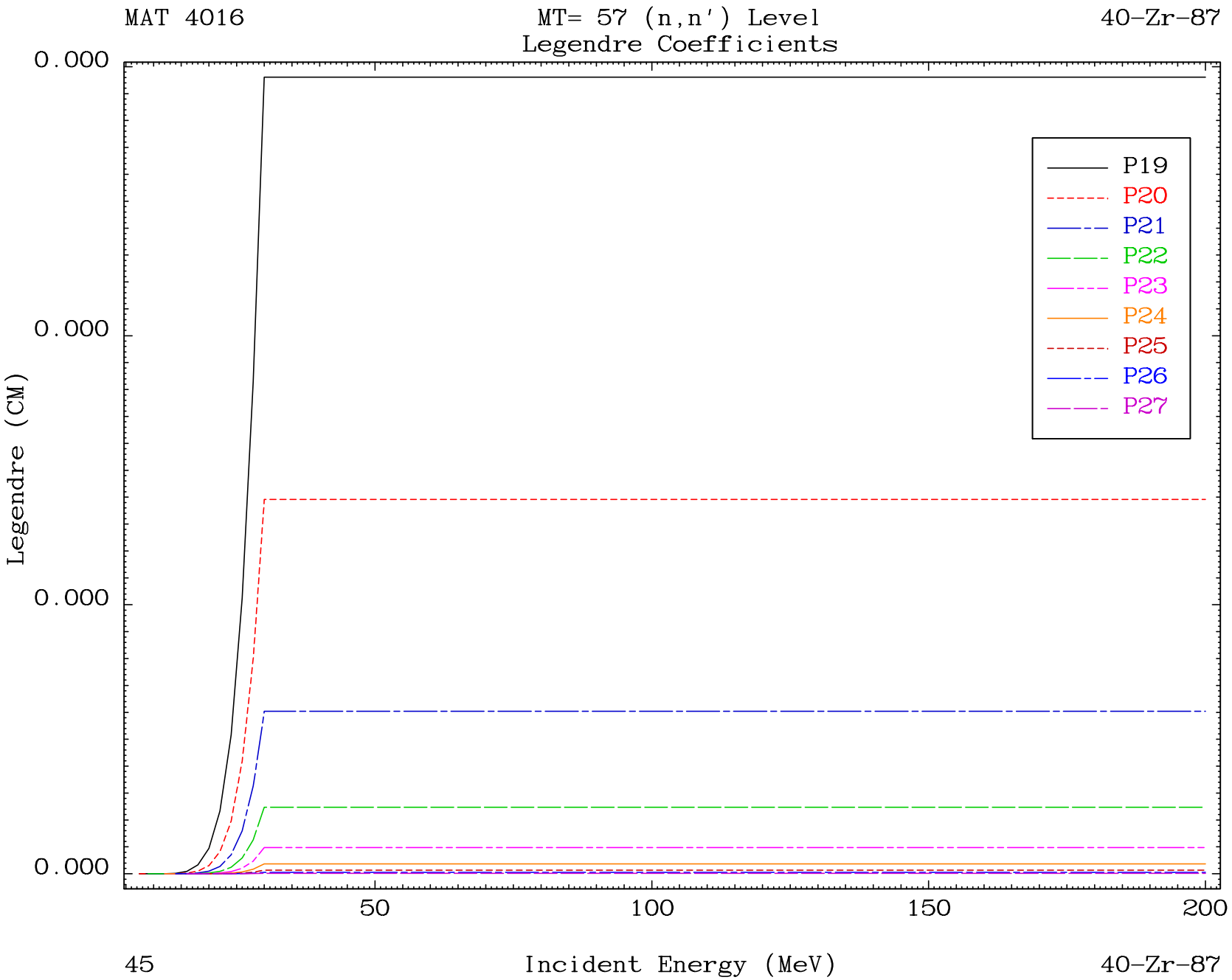

MAT 4016
MT= 56 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.04
0.02
0.00
-0.02
Legendre (CM)
0
50
100
150
200
40
Incident Energy (MeV)
40-Zr-87

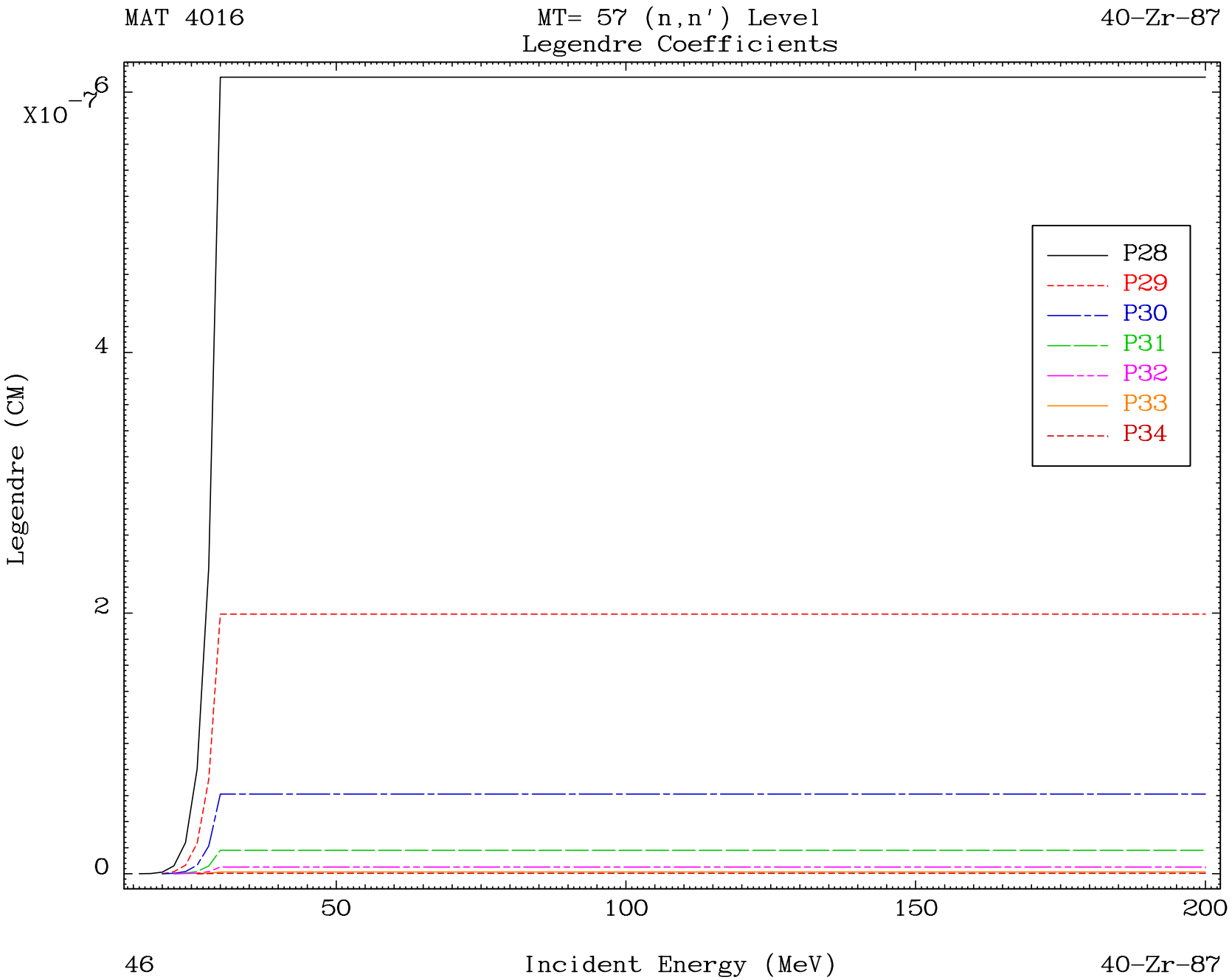

MAT 4016
MT= 56 (n,n') Level
Legendre Coefficients
40-Zr-87
0.000
0.000
0.000
0.000
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
41
Incident Energy (MeV)
40-Zr-87

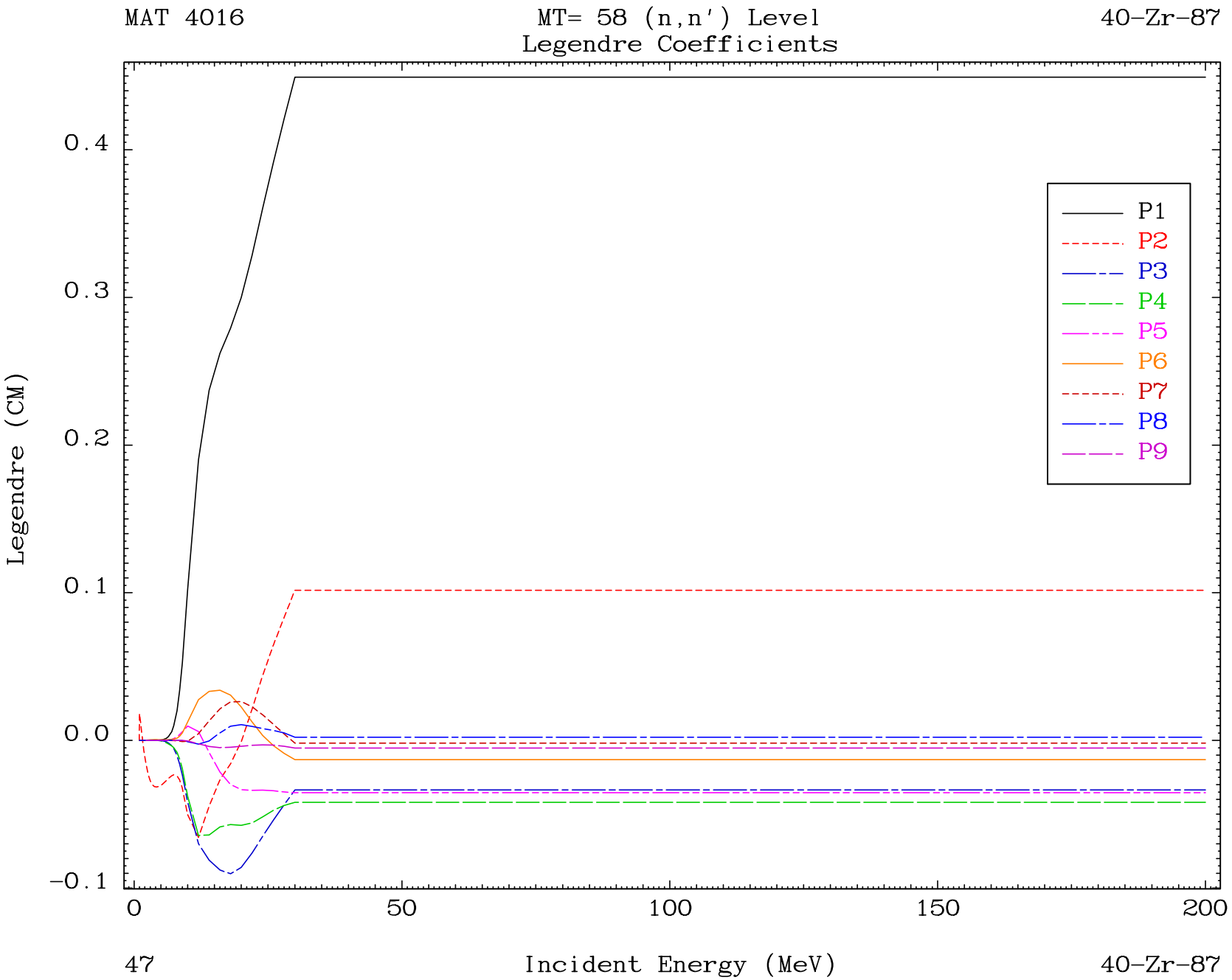

MAT 4016
MT= 56 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-6
4
2
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
42
Incident Energy (MeV)
40-Zr-87

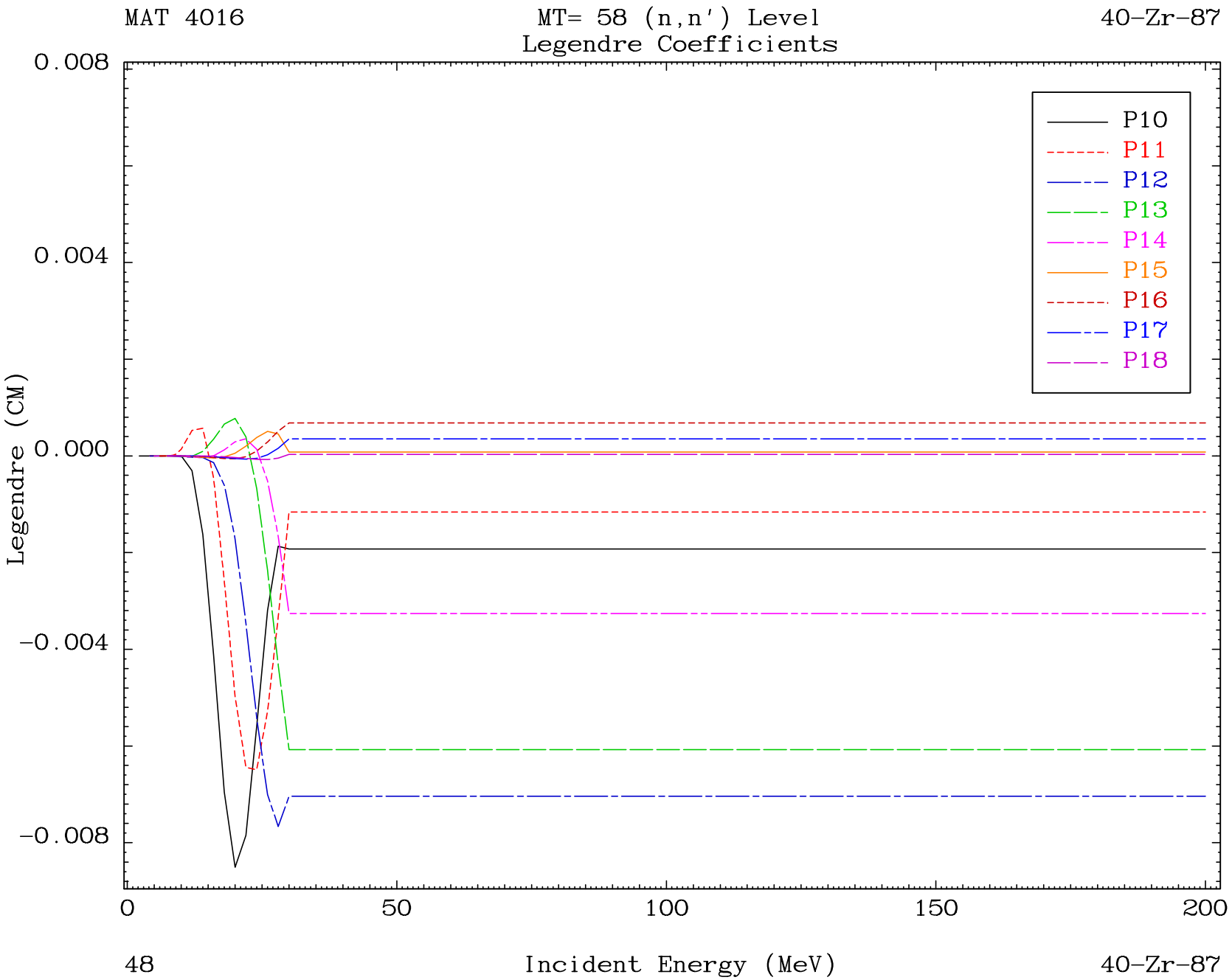

MAT 4016
MT= 57 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.5
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
P1
P2
P3
P4
P5
P6
P7
P8
P9
43
Incident Energy (MeV)
40-Zr-87

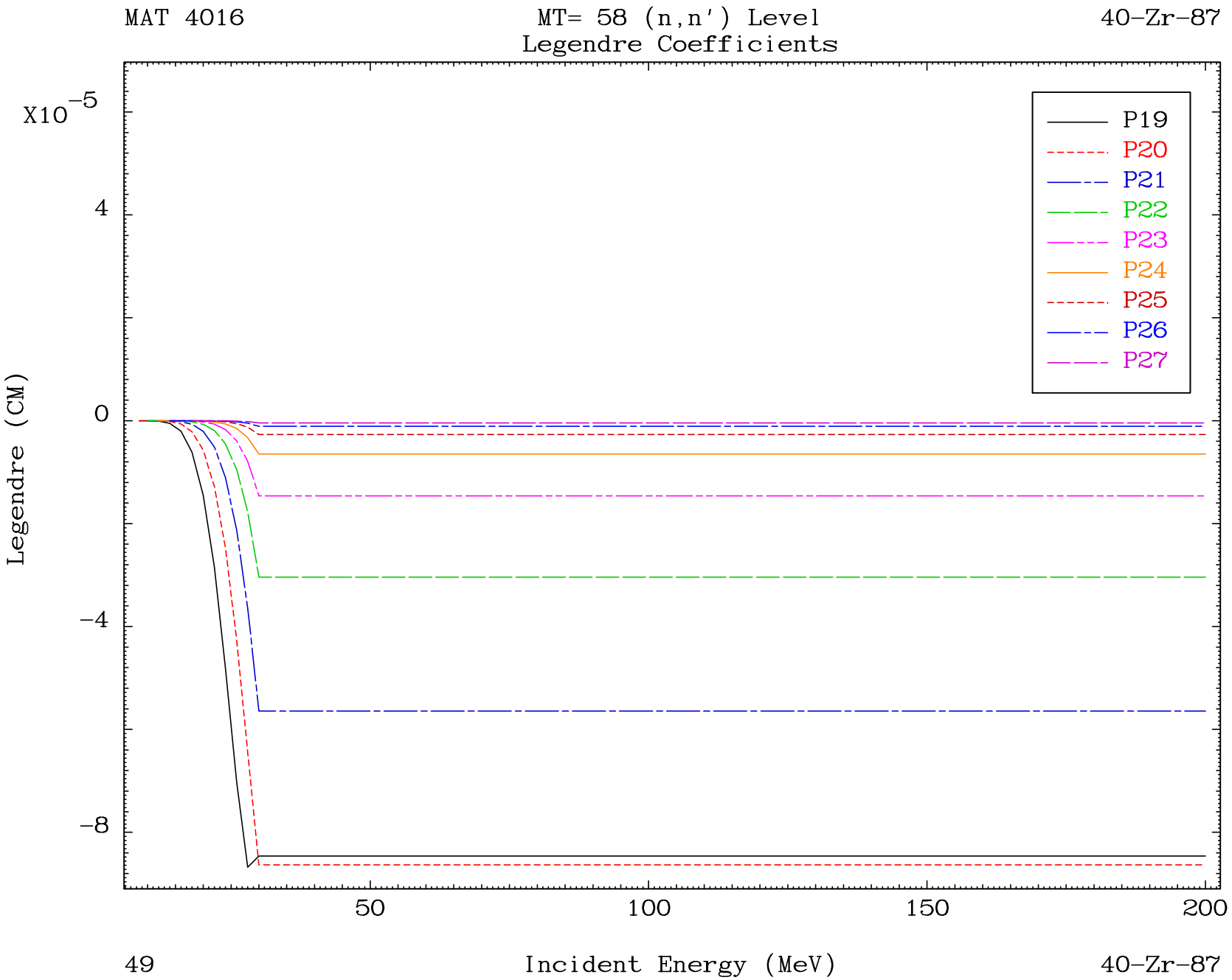

MAT 4016
MT= 57 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.04
0.02
0.00
-0.02
Legendre (CM)
0
50
100
150
200
44
Incident Energy (MeV)
40-Zr-87

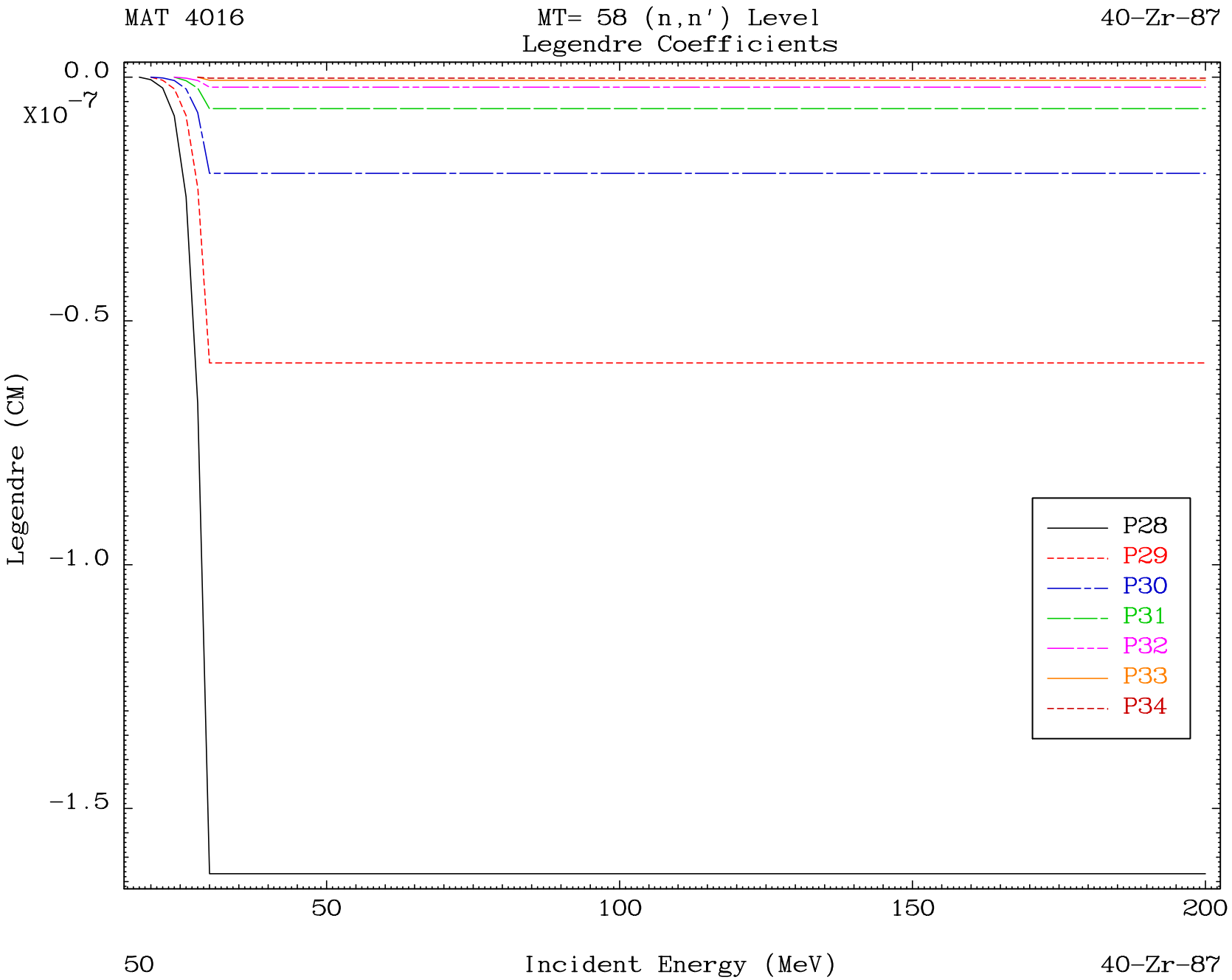

MAT 4016
MT= 57 (n,n') Level
Legendre Coefficients
40-Zr-87
0.000
0.000
0.000
0.000
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
45
Incident Energy (MeV)
40-Zr-87

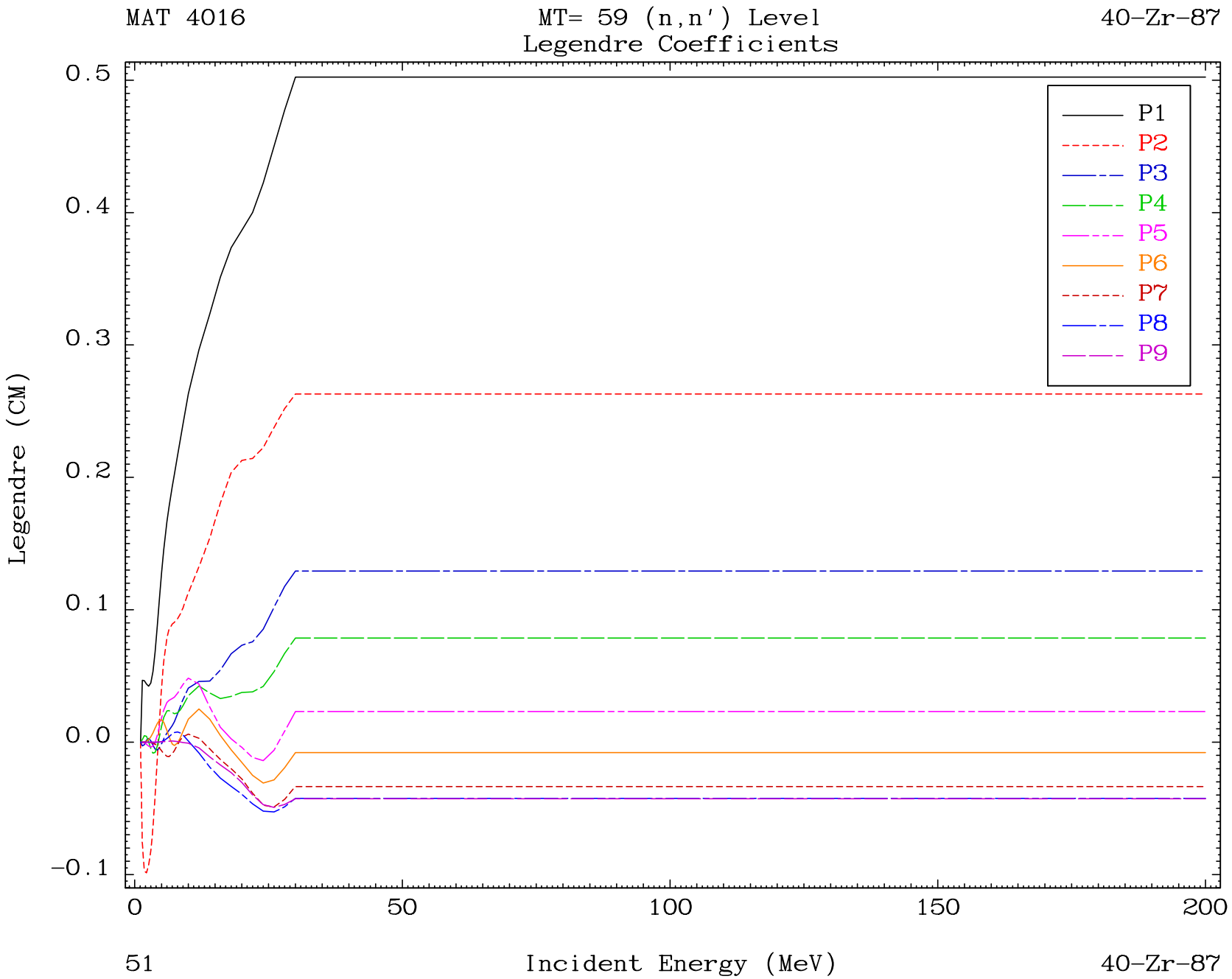

MAT 4016
MT= 57 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-6
4
2
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
46
Incident Energy (MeV)
40-Zr-87

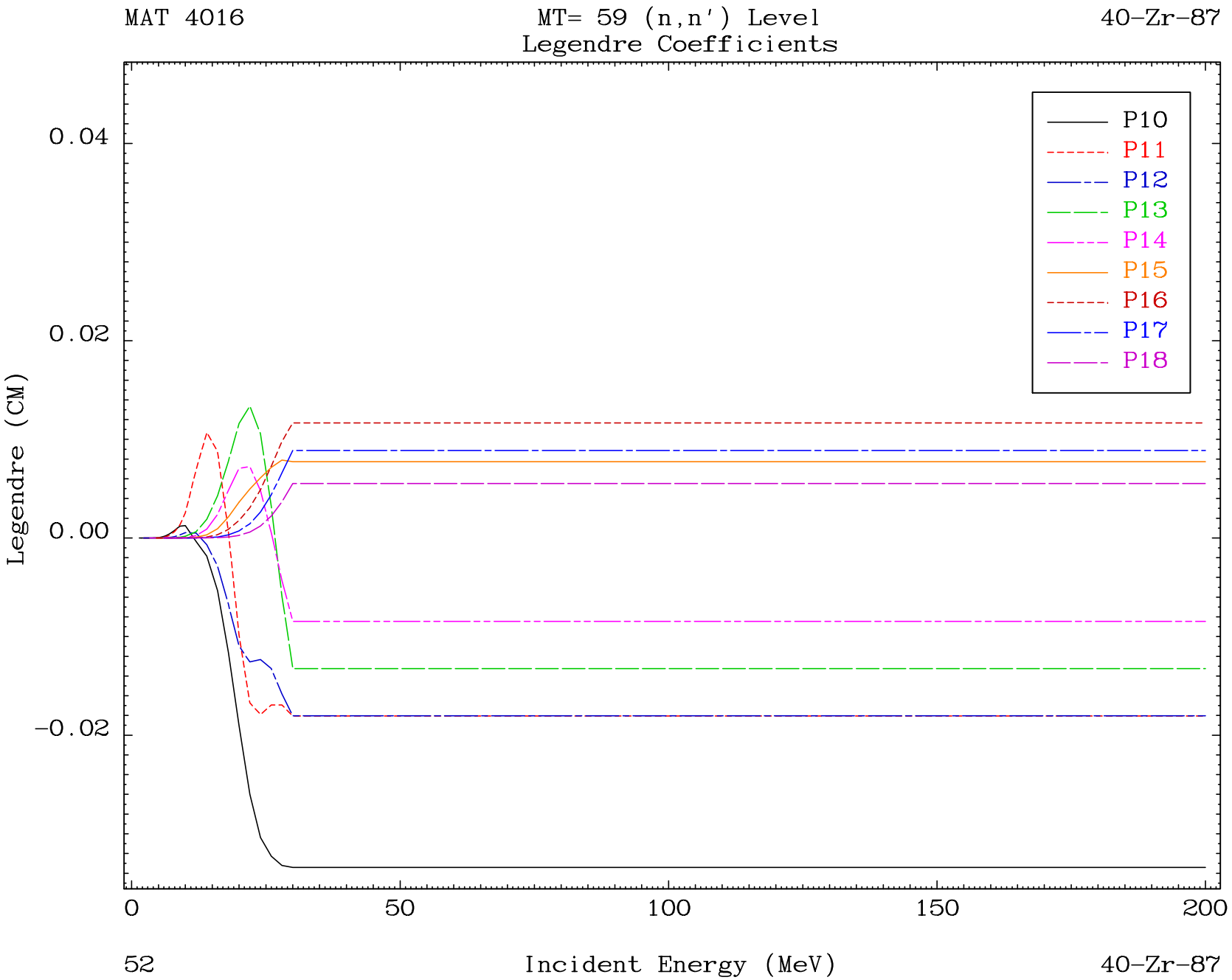

MAT 4016
MT= 58 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
-0.1
0
50
100
150
200
47
Incident Energy (MeV)
40-Zr-87
P1
P2
P3
P4
P5
P6
P7
P8
P9

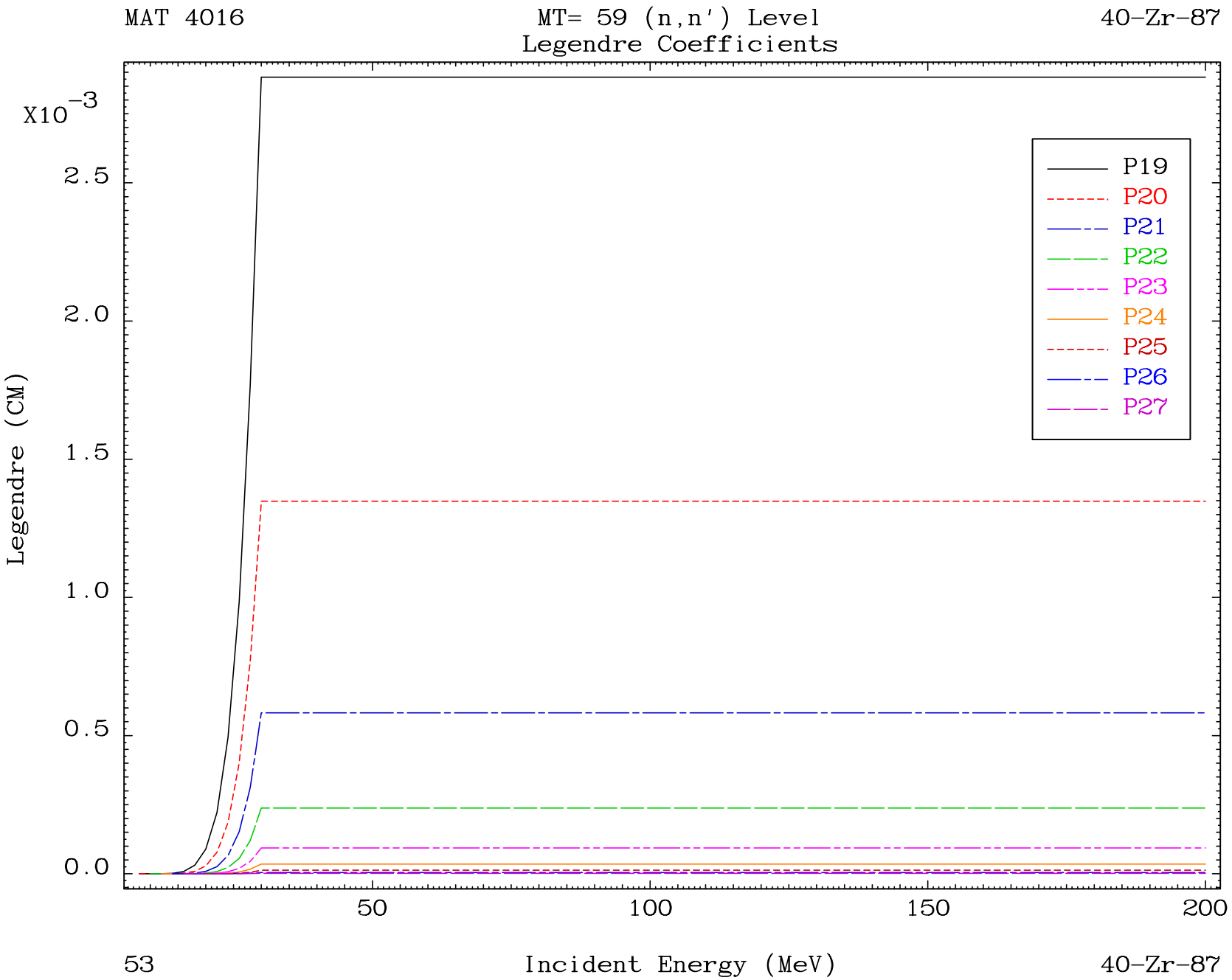

MAT 4016
MT= 58 (n,n') Level
Legendre Coefficients
40-Zr-87
0.008
0.004
0.000
-0.004
-0.008
Legendre (CM)
P10
P11
P12
P13
P14
P15
P16
P17
P18
0
50
100
150
200
48
Incident Energy (MeV)
40-Zr-87

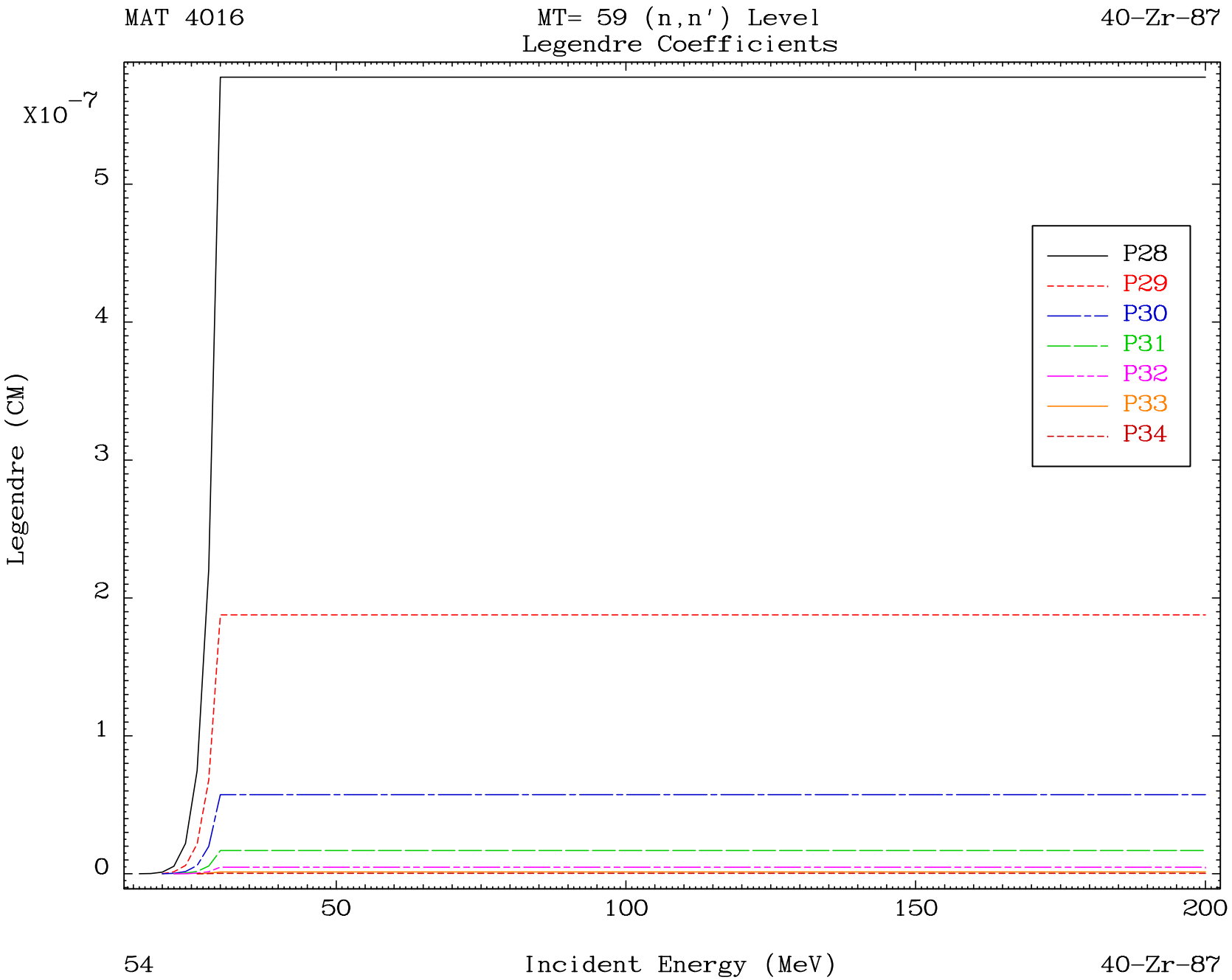

MAT 4016
MT= 58 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-5
4
0
-4
-8
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
49
Incident Energy (MeV)
40-Zr-87

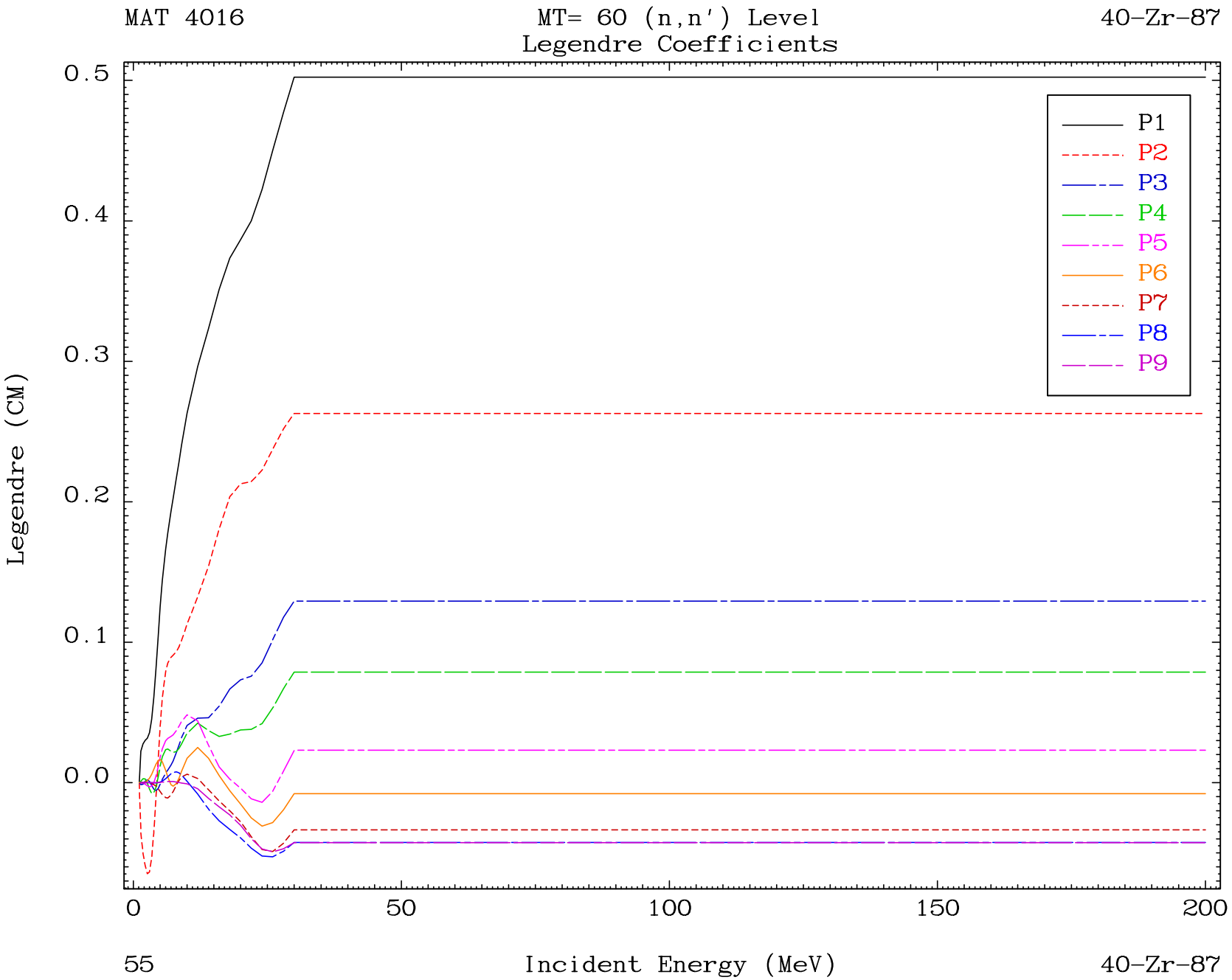

MAT 4016
MT= 58 (n,n') Level
Legendre Coefficients
40-Zr-87
0.0
X10-7
-0.5
-1.0
-1.5
Legendre (CM)
50
100
150
200
50
Incident Energy (MeV)
40-Zr-87
P28
P29
P30
P31
P32
P33
P34

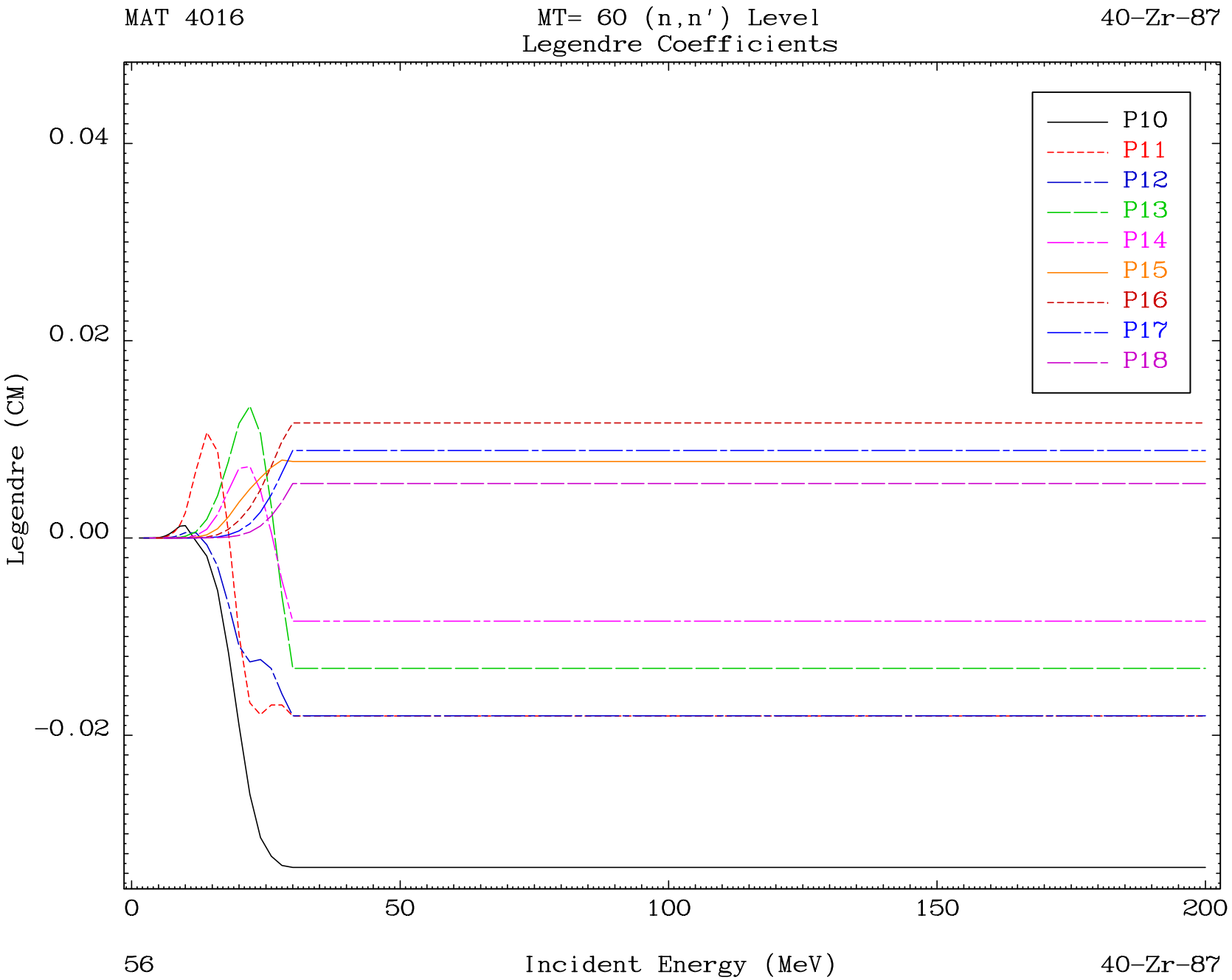

MAT 4016
MT= 59 (n,n') Level
Legendre Coefficients
40-Zr-87
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
Legendre (CM)
P1
P2
P3
P4
P5
P6
P7
P8
P9
0
50
100
150
200
51
Incident Energy (MeV)
40-Zr-87

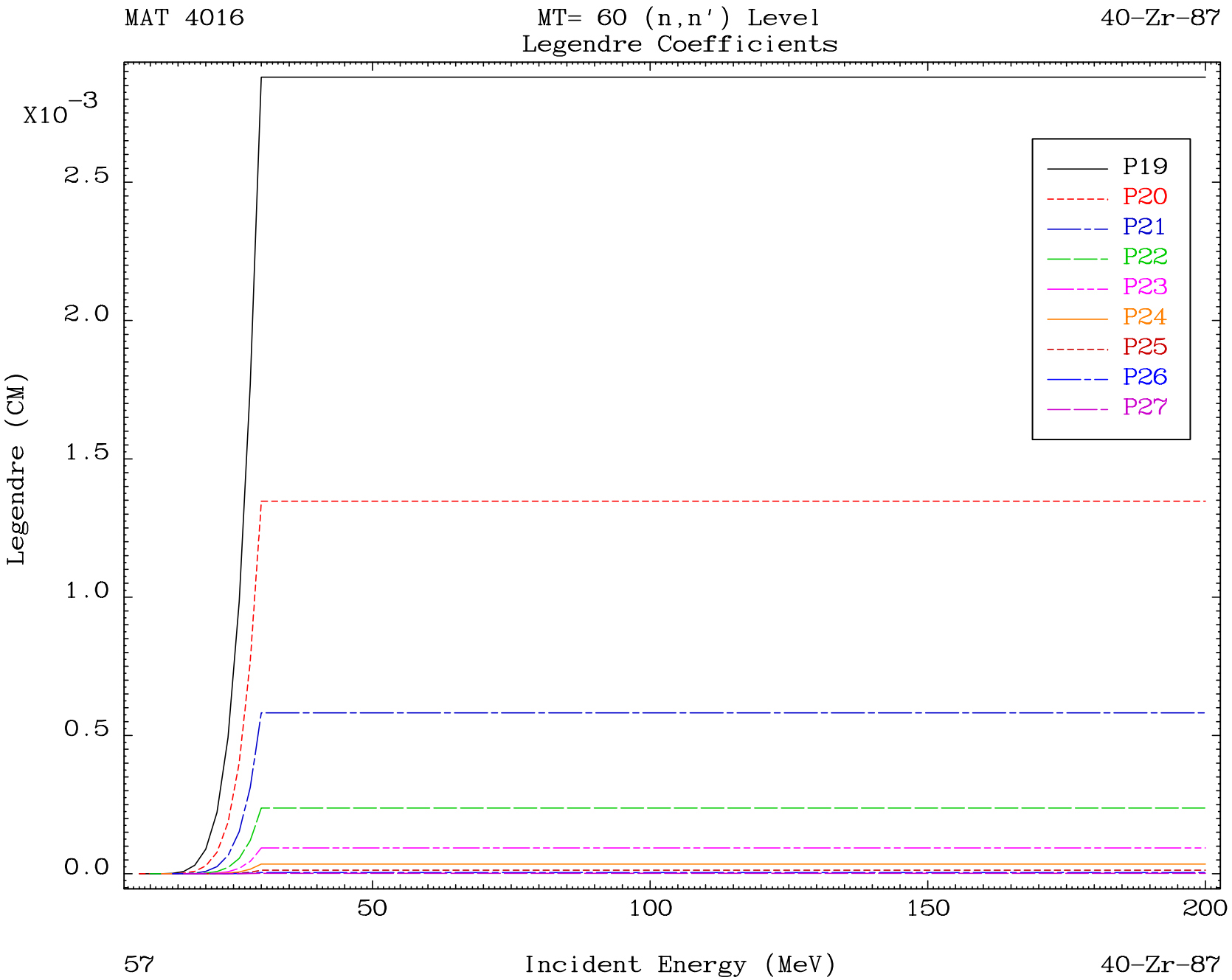

MAT 4016
MT= 59 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.04
0.02
0.00
-0.02
Legendre (CM)
0
50
100
150
200
52
Incident Energy (MeV)
40-Zr-87

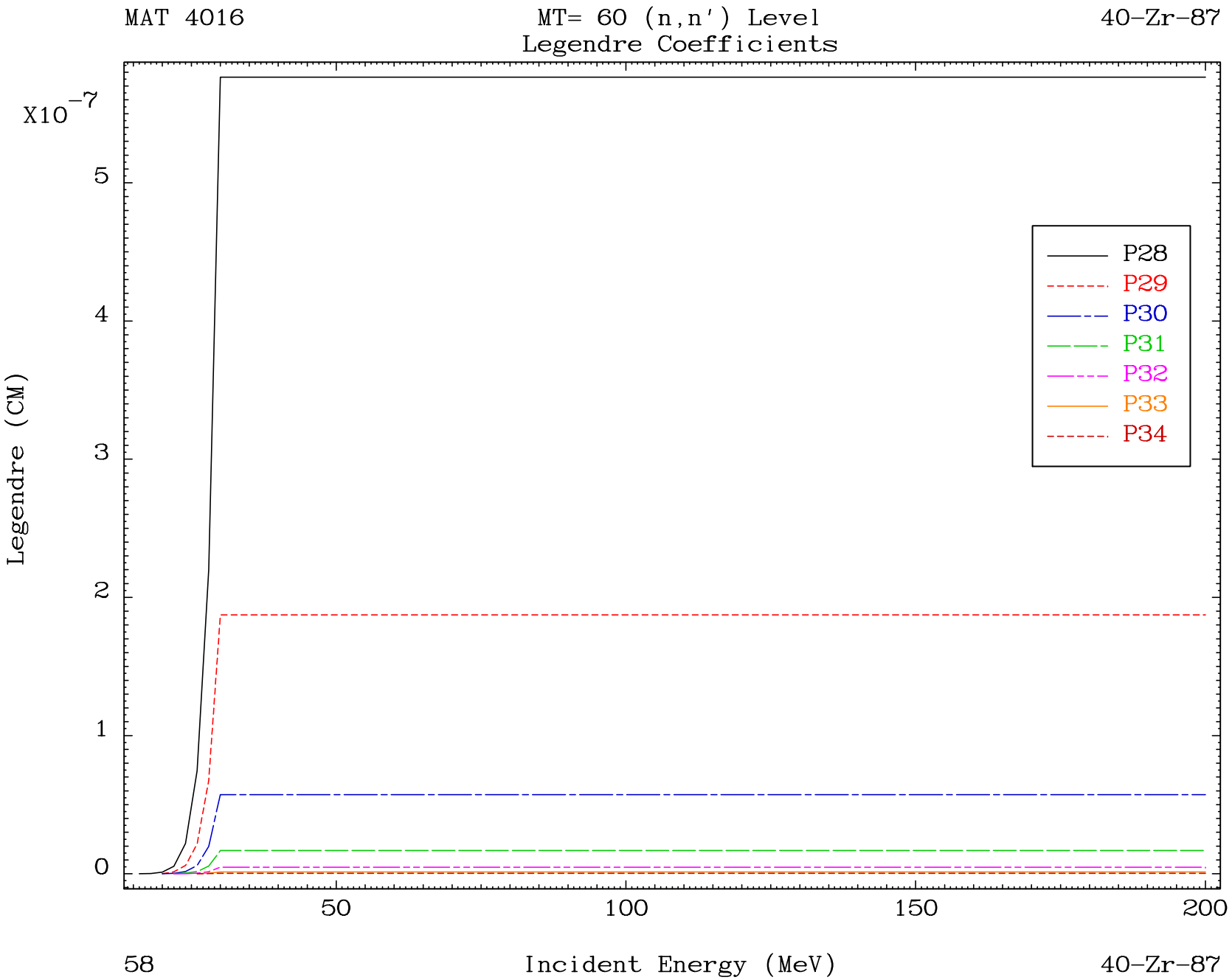

MAT 4016
MT= 59 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-3
2.5
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
53
Incident Energy (MeV)
40-Zr-87

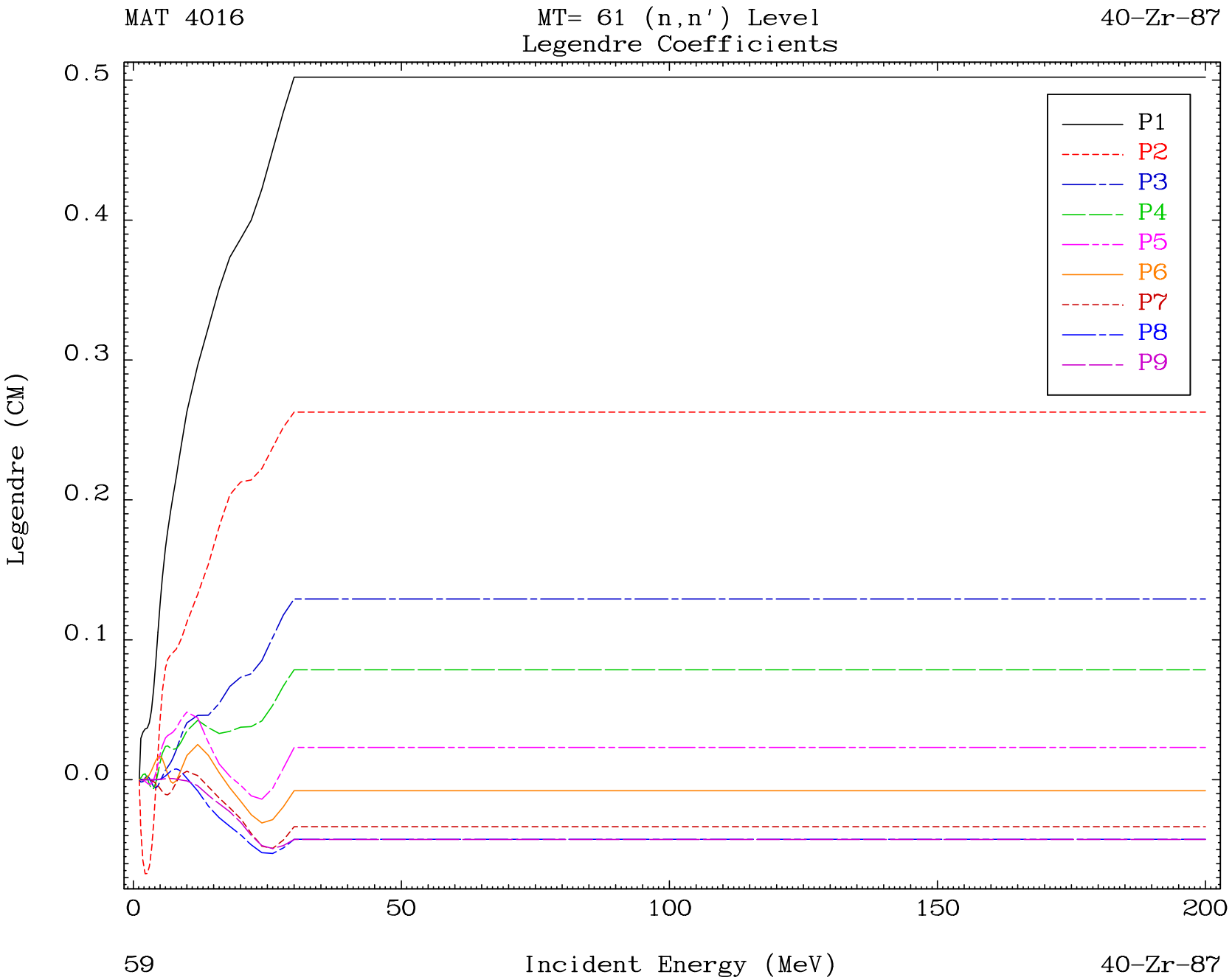

MAT 4016
MT= 59 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-7
5
4
3
2
1
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
54
Incident Energy (MeV)
40-Zr-87

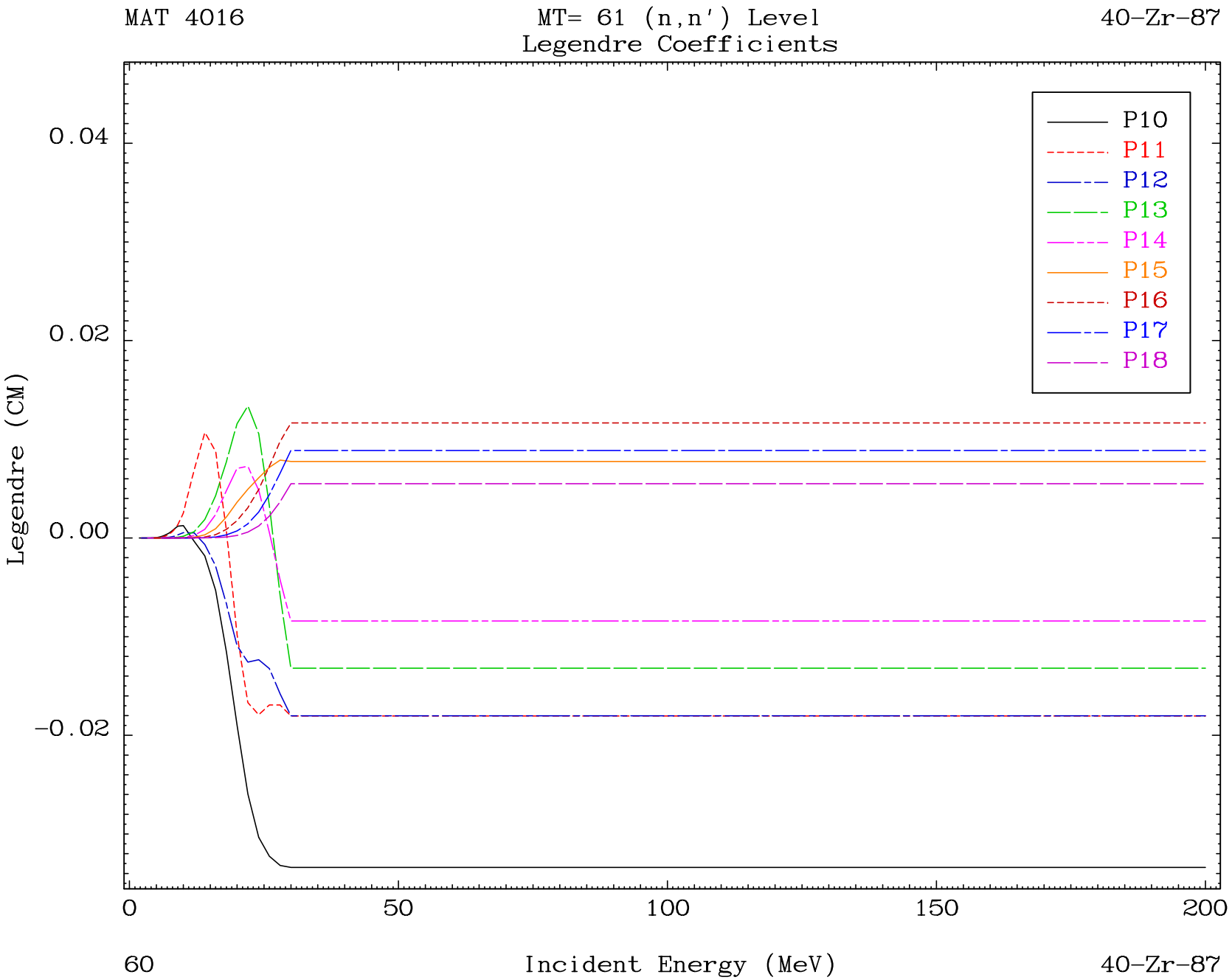

MAT 4016
MT= 60 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.5
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
P1
P2
P3
P4
P5
P6
P7
P8
P9
55
Incident Energy (MeV)
40-Zr-87

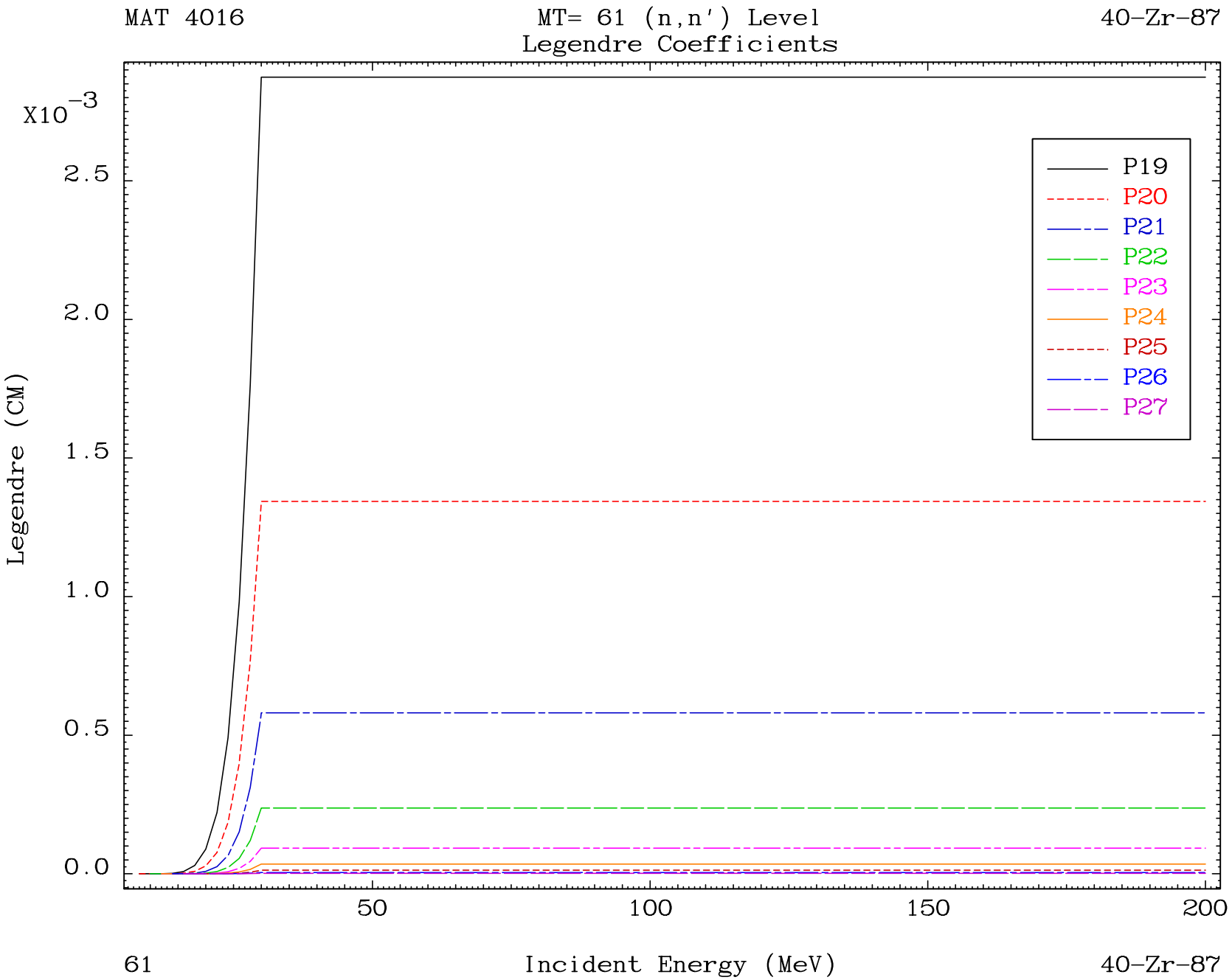

MAT 4016
MT= 60 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.04
0.02
0.00
-0.02
Legendre (CM)
0
50
100
150
200
56
Incident Energy (MeV)
40-Zr-87

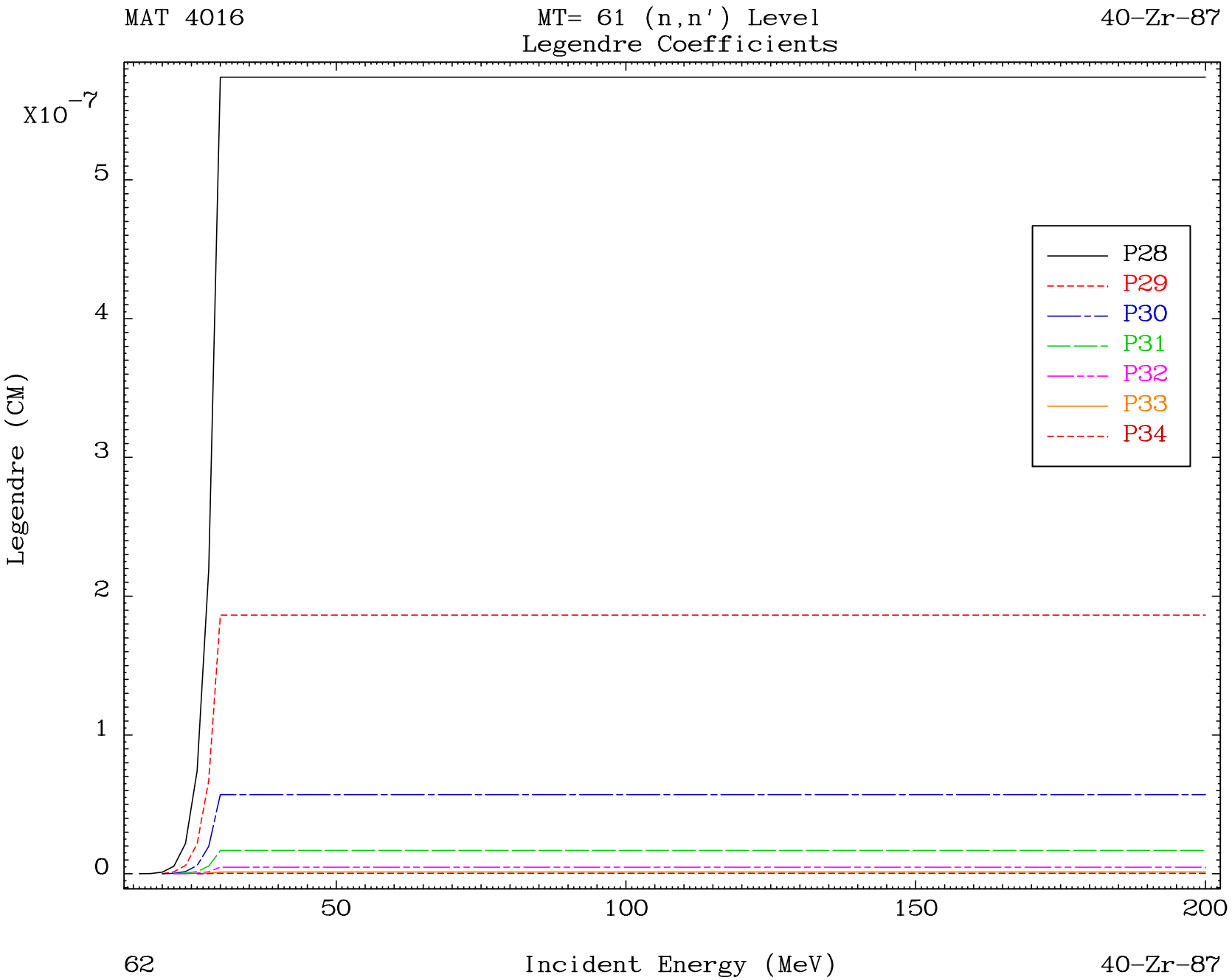

MAT 4016
MT= 60 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-3
2.5
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
57
Incident Energy (MeV)
40-Zr-87

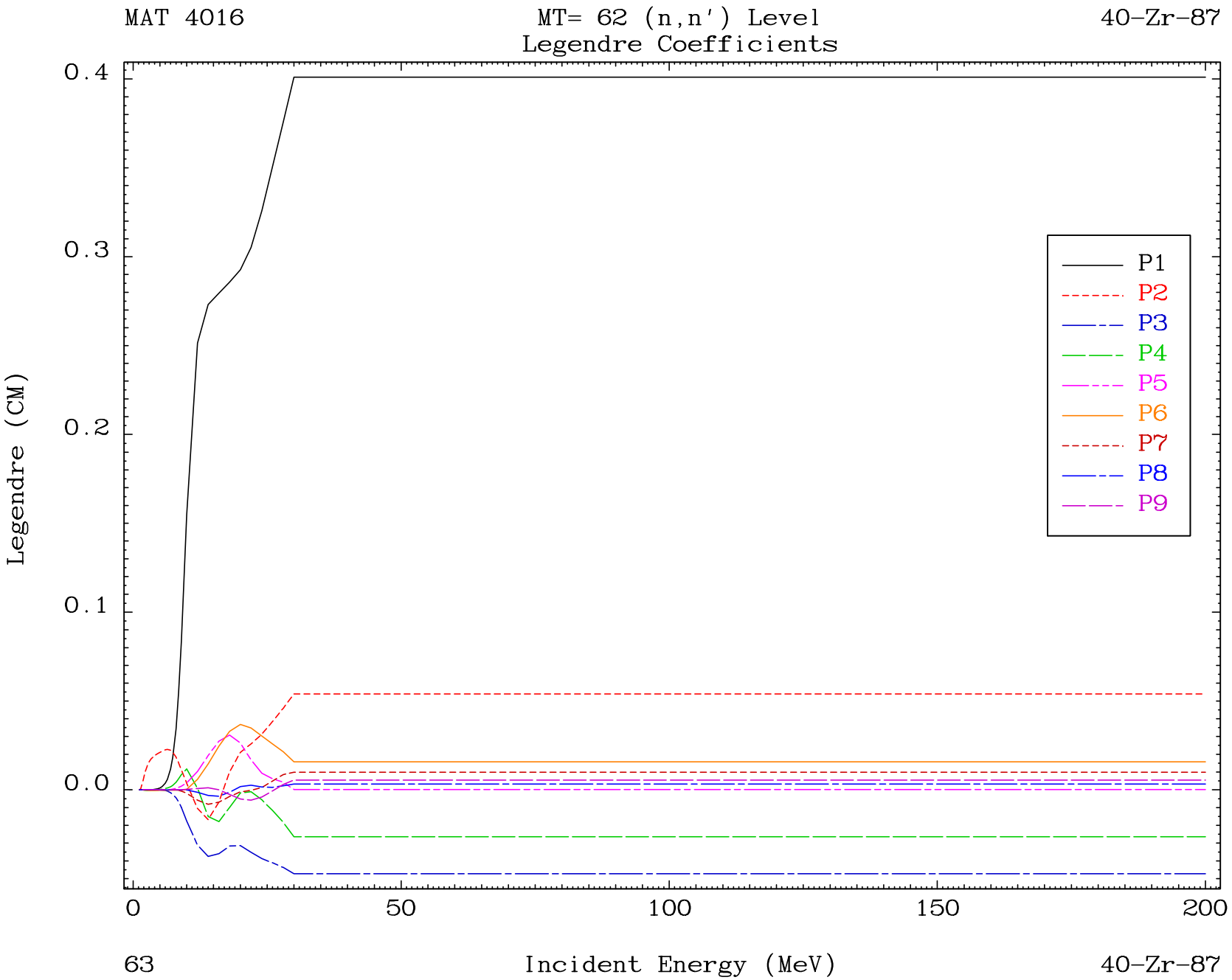

MAT 4016
MT= 60 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-7
5
4
3
2
1
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
58
Incident Energy (MeV)
40-Zr-87

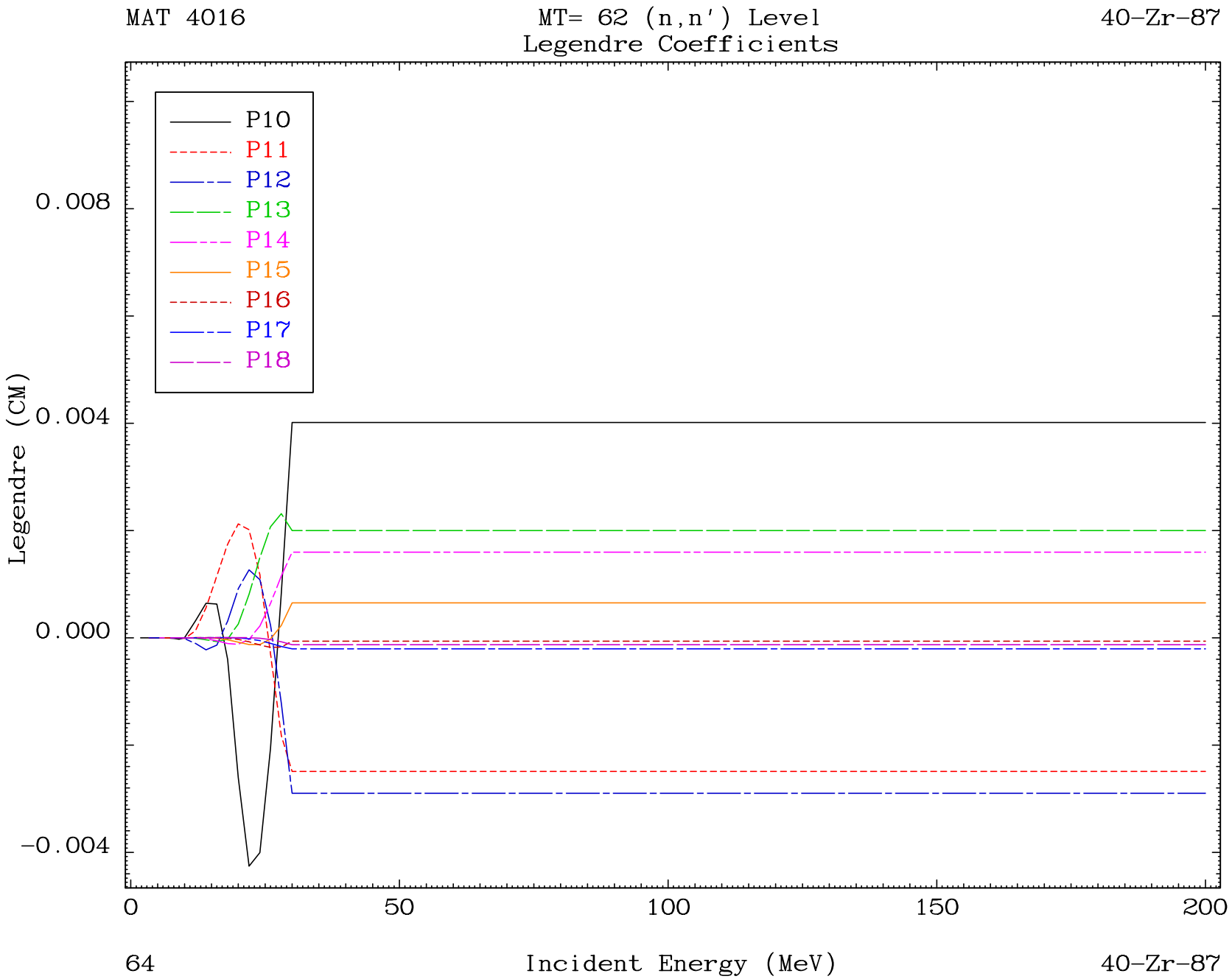

MAT 4016
MT= 61 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.5
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
P1
P2
P3
P4
P5
P6
P7
P8
P9
59
Incident Energy (MeV)
40-Zr-87

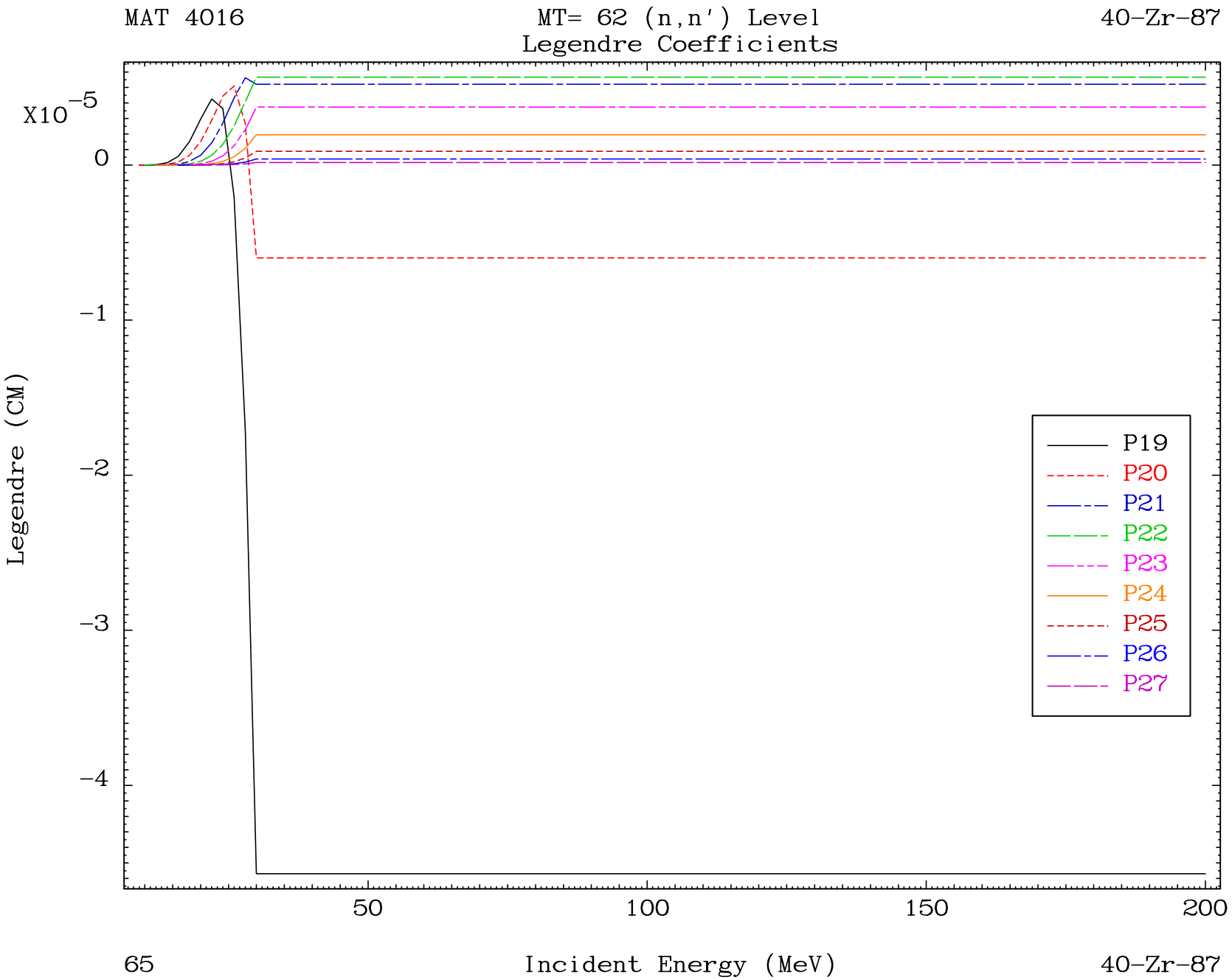

MAT 4016
MT= 61 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.04
0.02
0.00
-0.02
Legendre (CM)
0
50
100
150
200
60
Incident Energy (MeV)
40-Zr-87

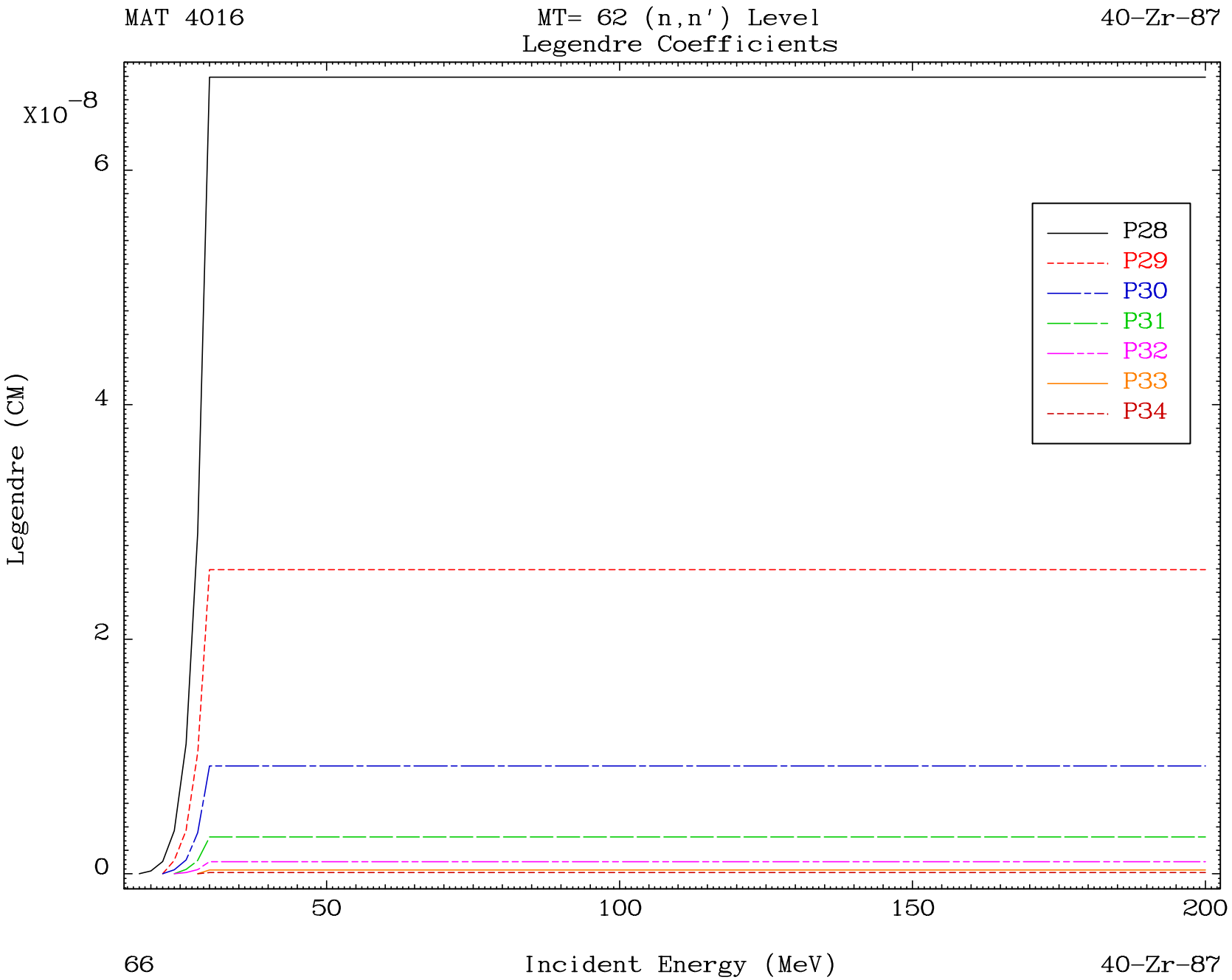

MAT 4016
MT= 61 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-3
2.5
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
61
Incident Energy (MeV)
40-Zr-87

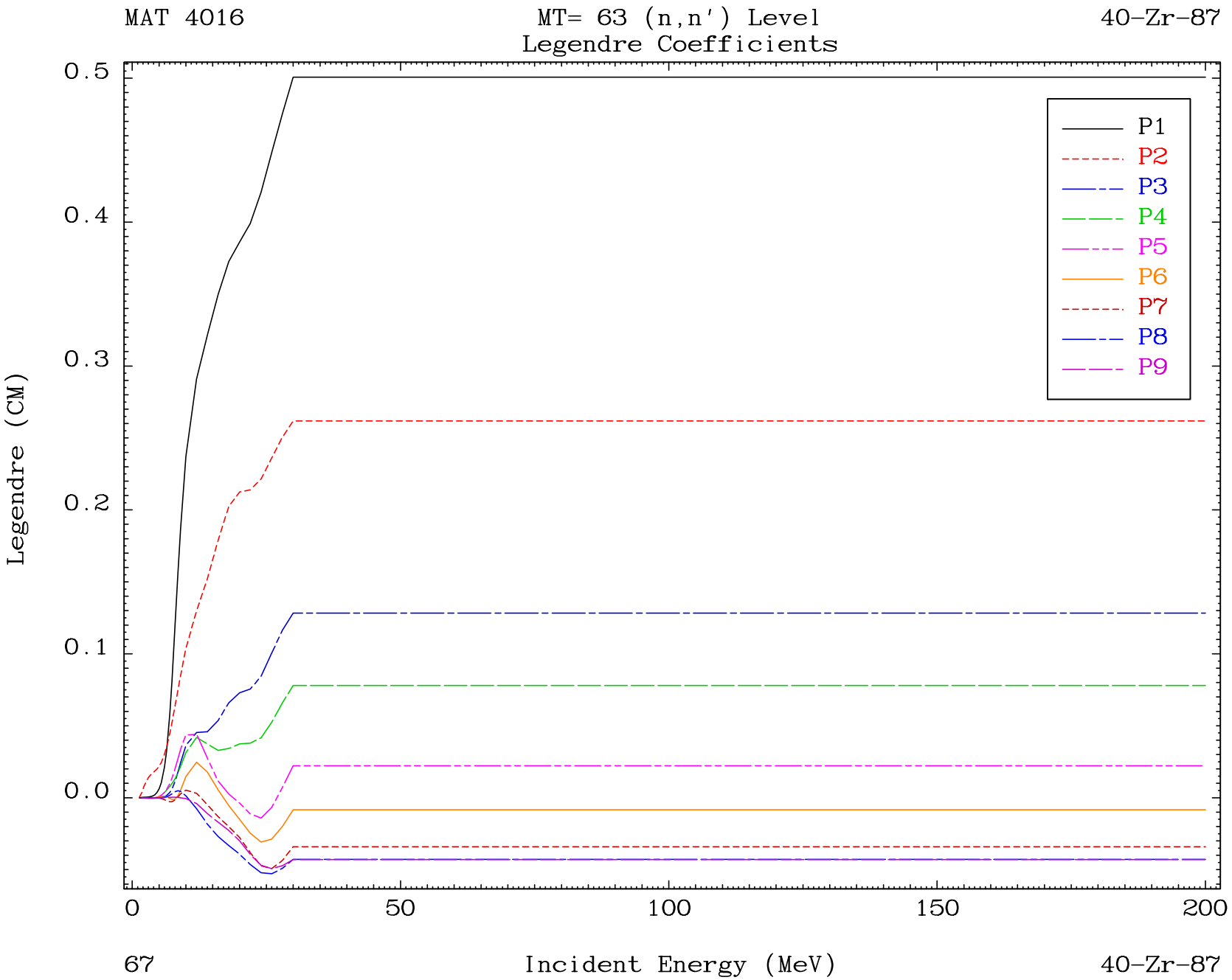

MAT 4016
MT= 61 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-7
5
4
3
2
1
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
62
Incident Energy (MeV)
40-Zr-87

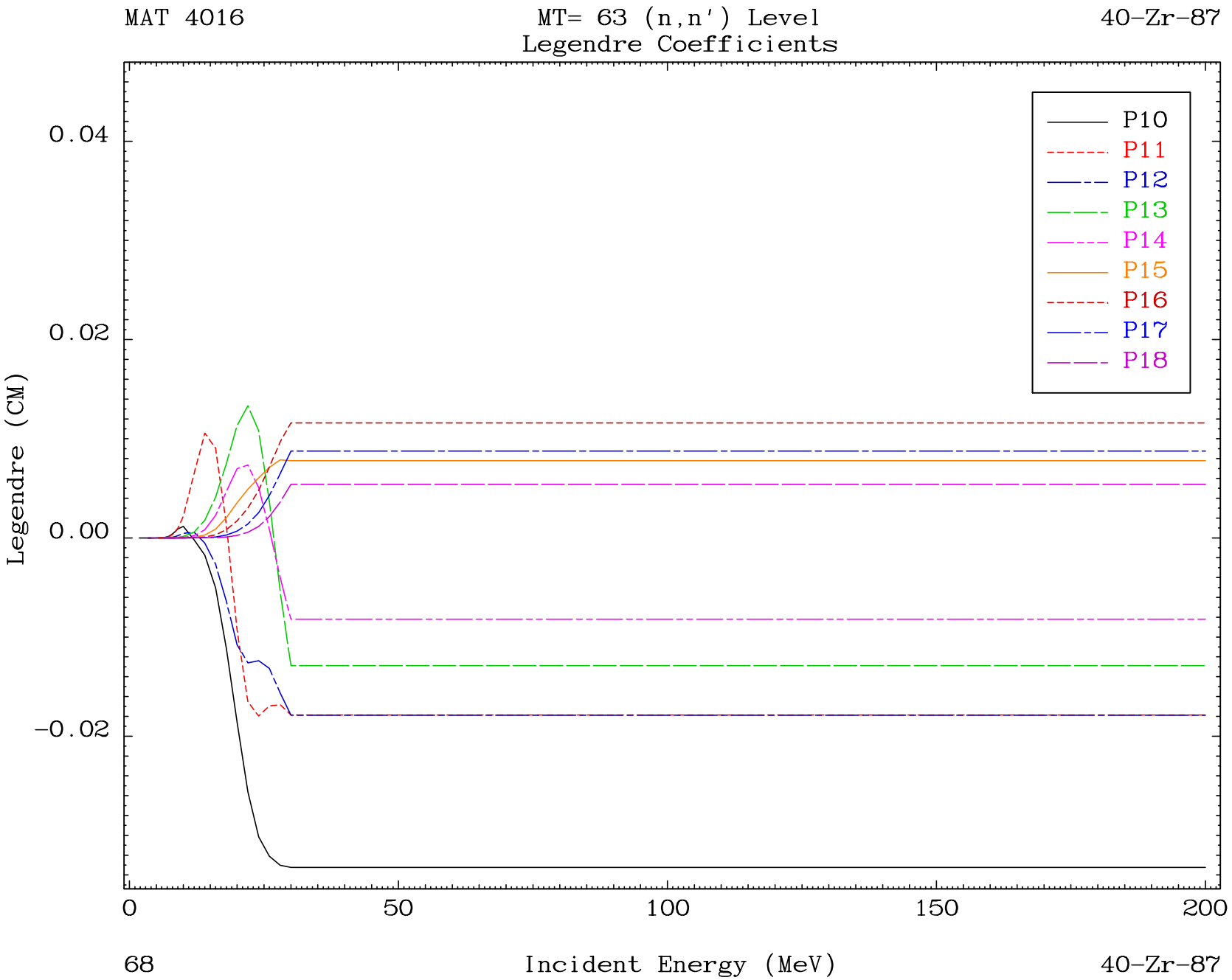

MAT 4016
MT= 62 (n,n') Level
Legendre Coefficients
40-Zr-87
0.4
0.3
0.2
0.1
0.0
Legendre (CM)
P1
P2
P3
P4
P5
P6
P7
P8
P9
0
50
100
150
200
63
Incident Energy (MeV)
40-Zr-87

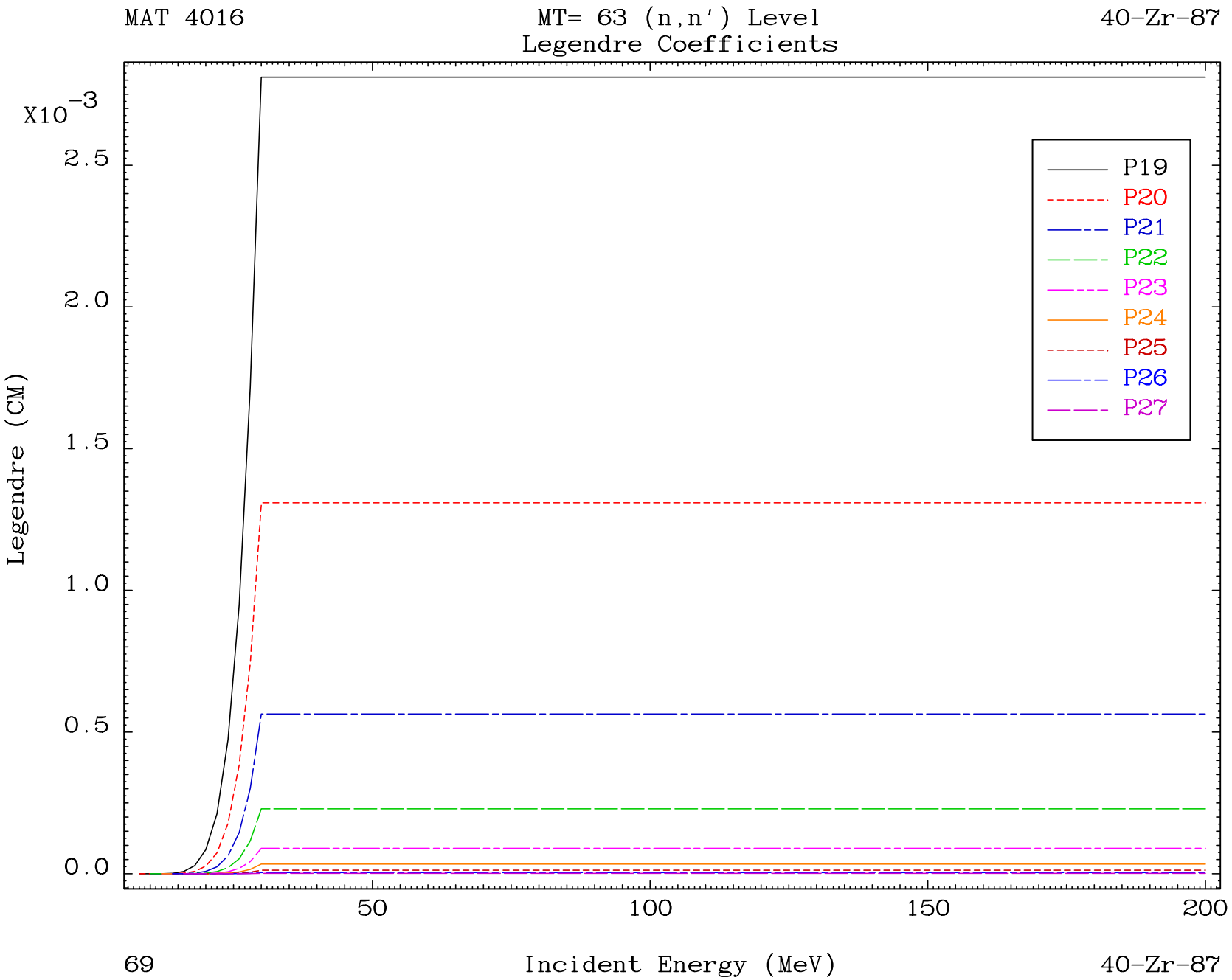

MAT 4016
MT= 62 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.008
0.004
0.000
-0.004
Legendre (CM)
0
50
100
150
200
64
Incident Energy (MeV)
40-Zr-87

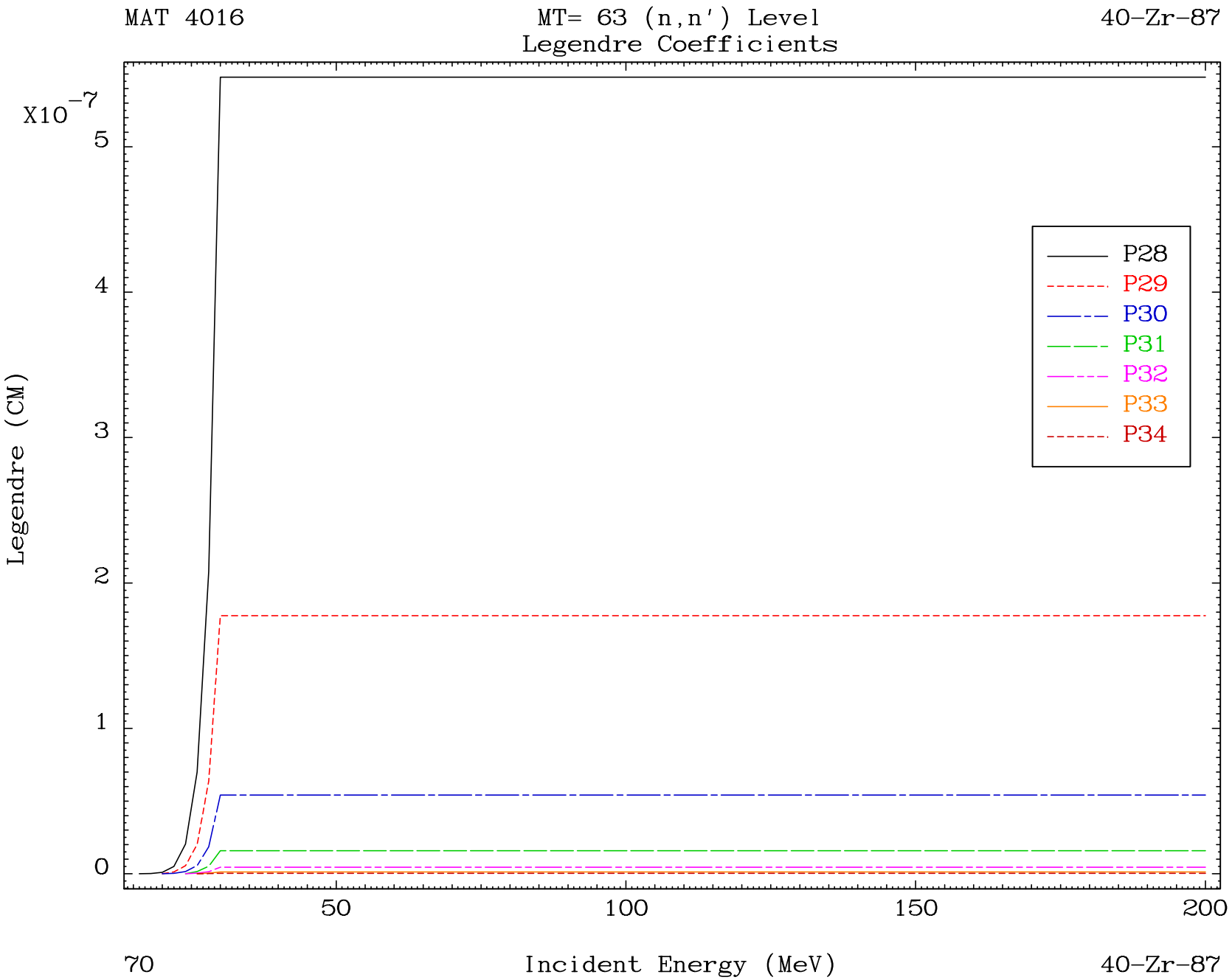

MAT 4016
MT= 62 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-5
0
-1
-2
-3
-4
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
65
Incident Energy (MeV)
40-Zr-87

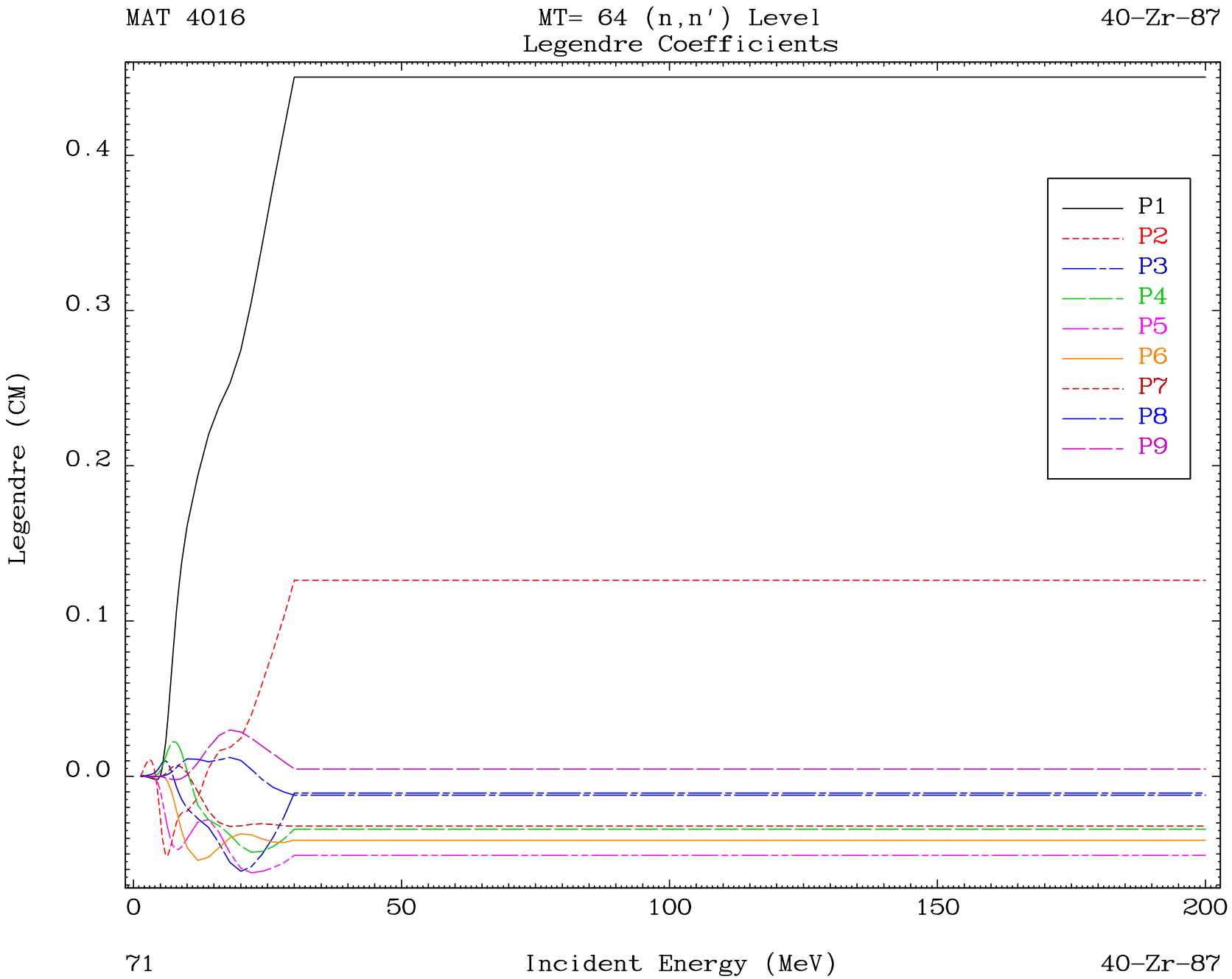

MAT 4016
MT= 62 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-8
6
4
2
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
66
Incident Energy (MeV)
40-Zr-87

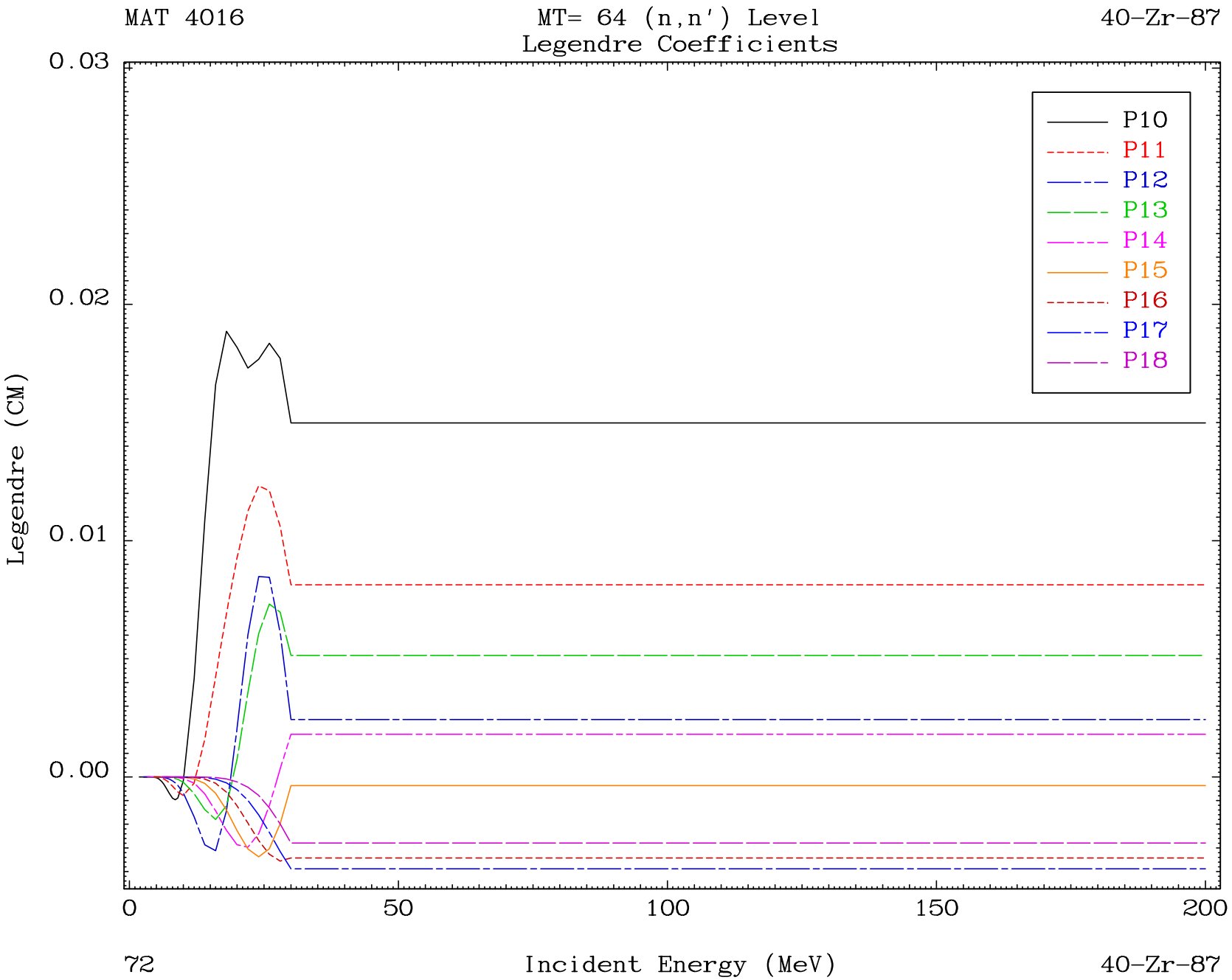

MAT 4016
MT= 63 (n,n') Level
Legendre Coefficients
40-Zr-87
0.5
0.4
0.3
0.2
0.1
0.0
Legendre (CM)
P1
P2
P3
P4
P5
P6
P7
P8
P9
0
50
100
150
200
67
Incident Energy (MeV)
40-Zr-87

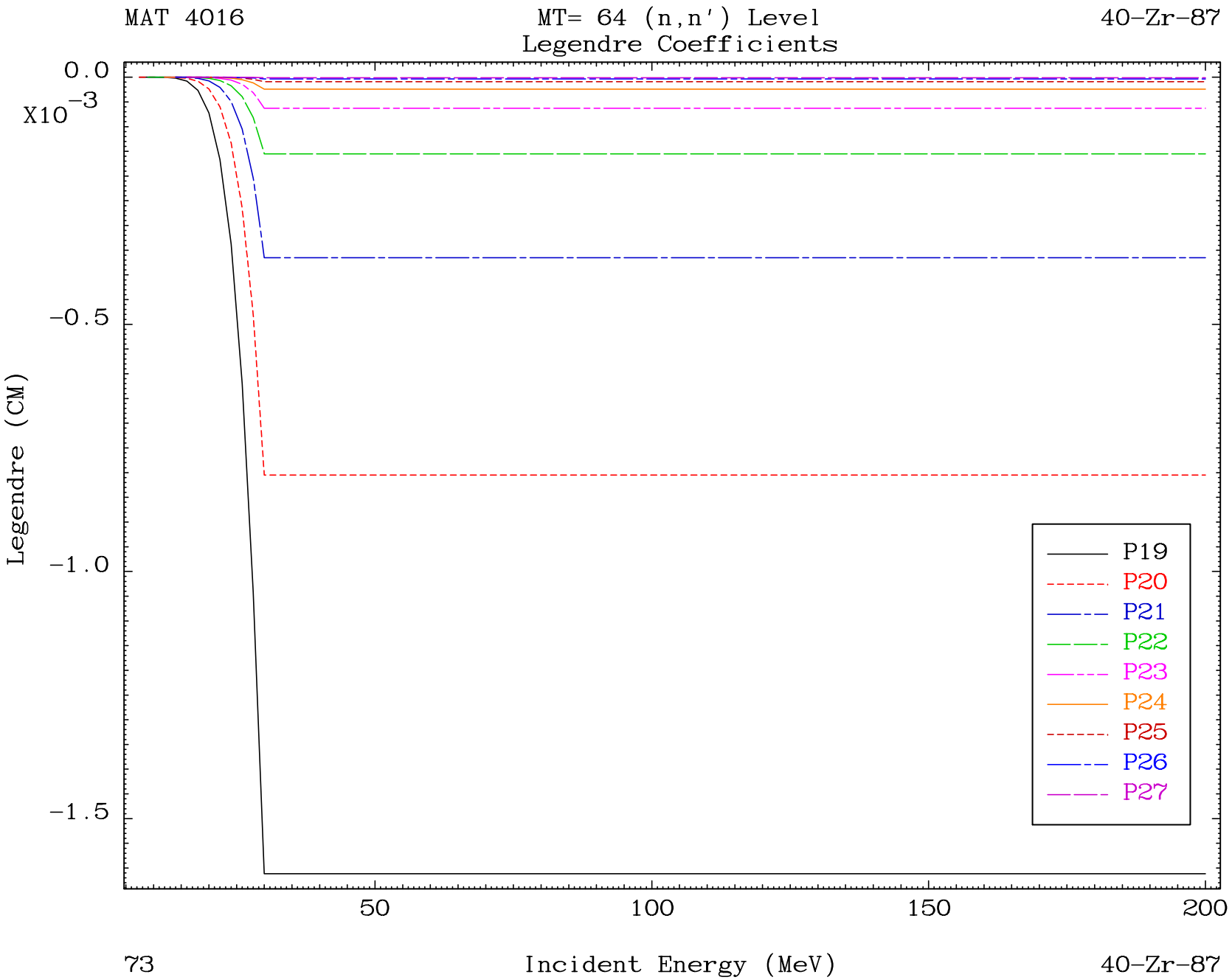

MAT 4016
MT= 63 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.04
0.02
0.00
-0.02
Legendre (CM)
0
50
100
150
200
68
Incident Energy (MeV)
40-Zr-87

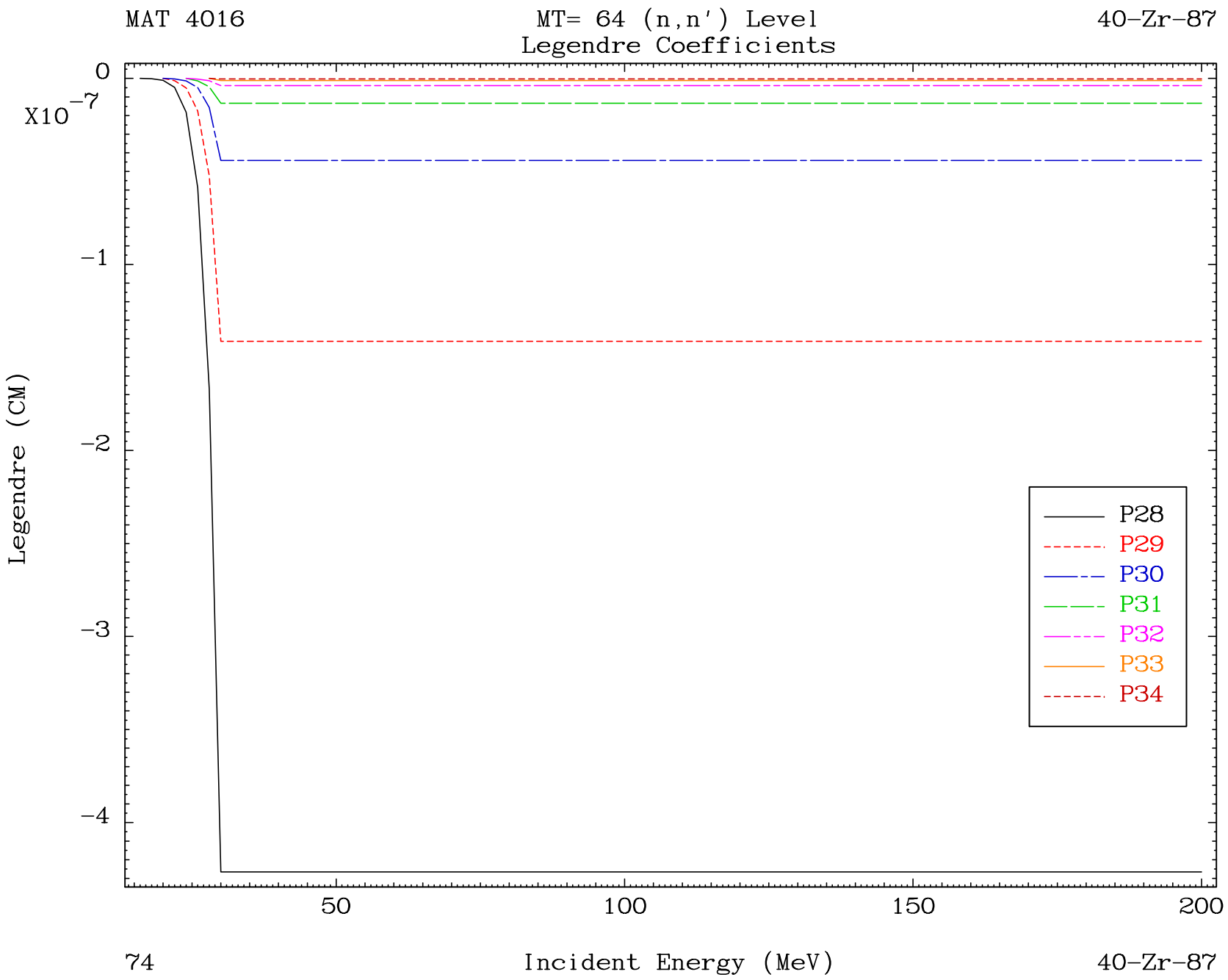

MAT 4016
MT= 63 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-3
2.5
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
69
Incident Energy (MeV)
40-Zr-87

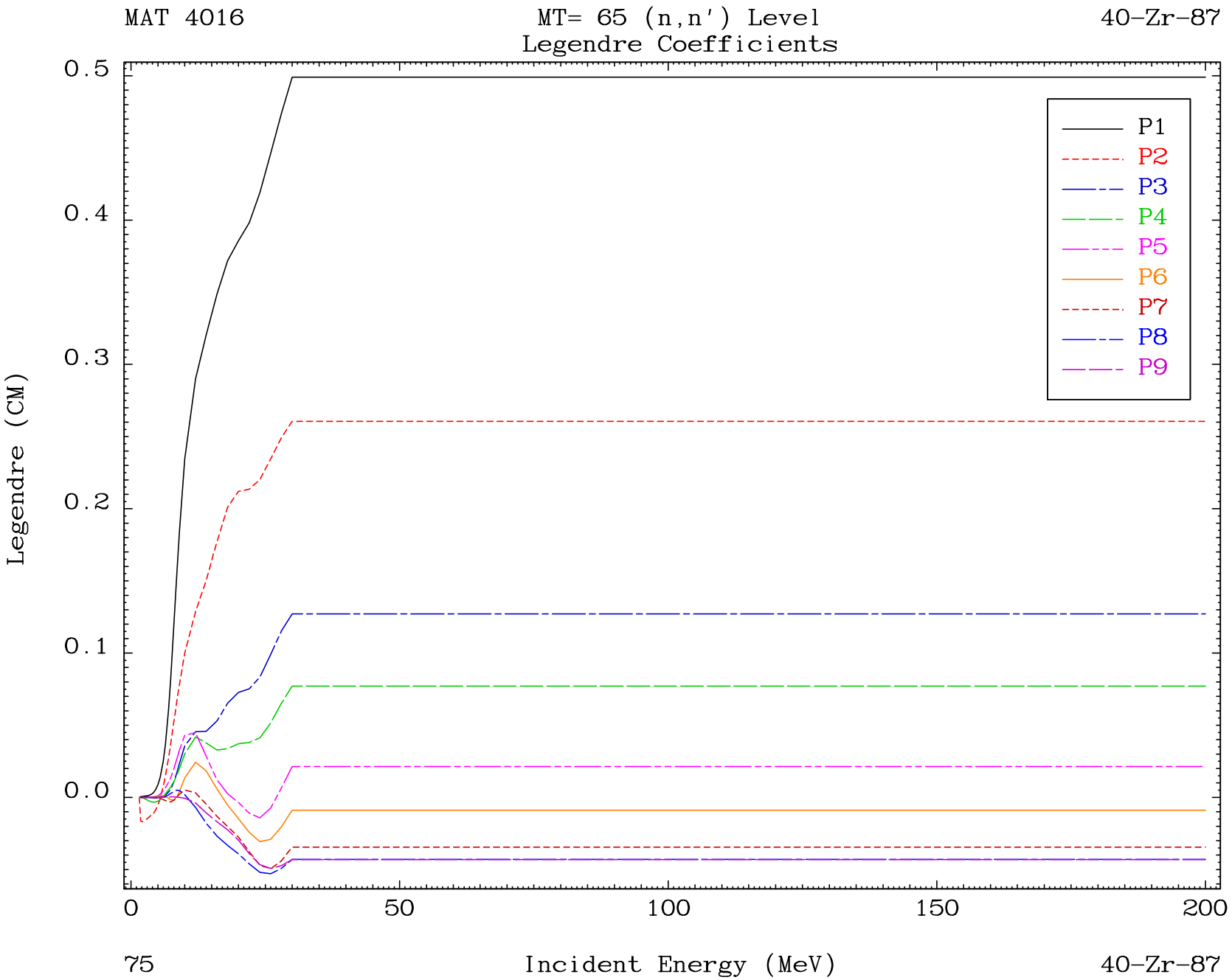

MAT 4016
MT= 63 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-7
5
4
3
2
1
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
70
Incident Energy (MeV)
40-Zr-87

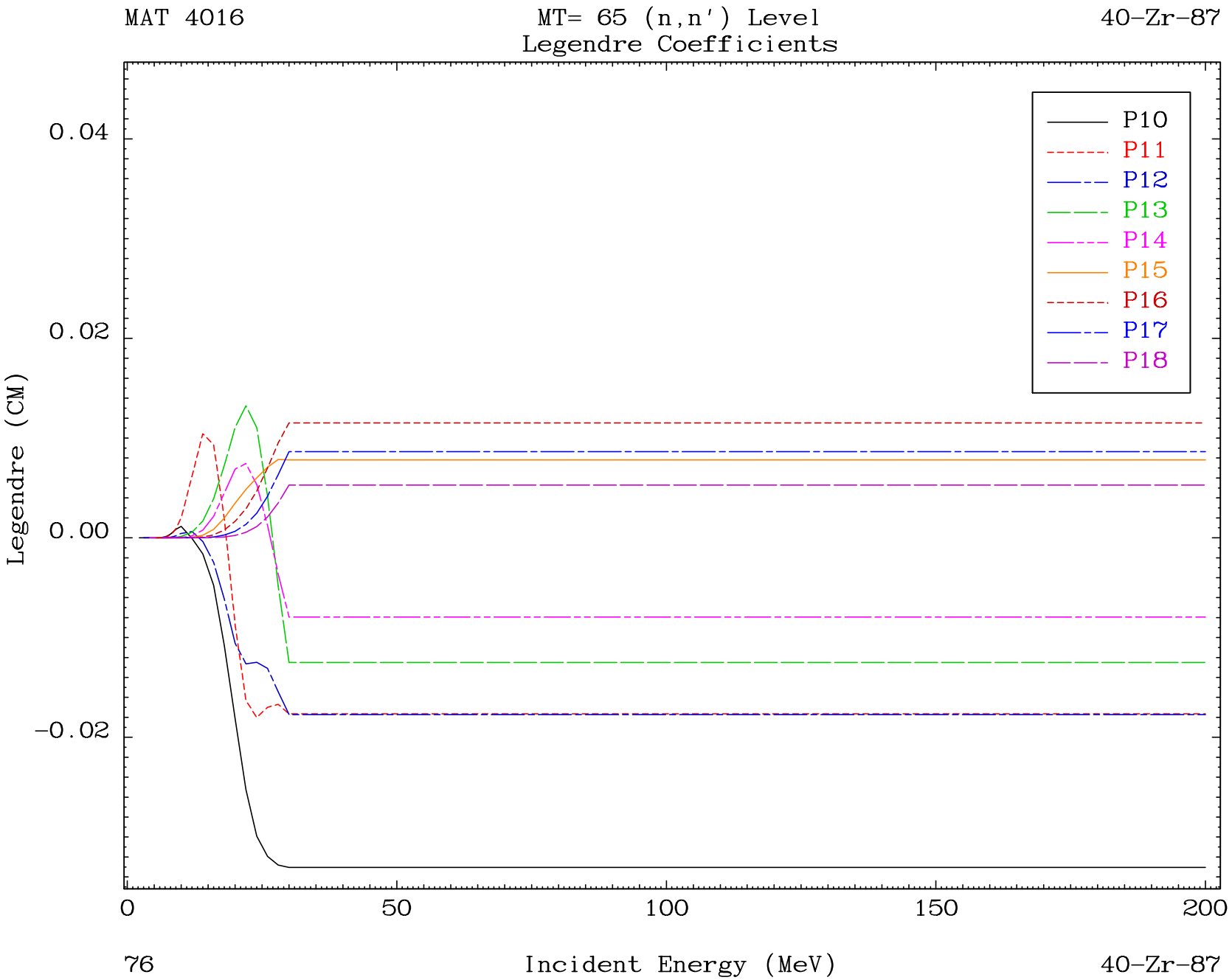

MAT 4016
MT= 64 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
P1
P2
P3
P4
P5
P6
P7
P8
P9
0
50
100
150
200
71
Incident Energy (MeV)
40-Zr-87

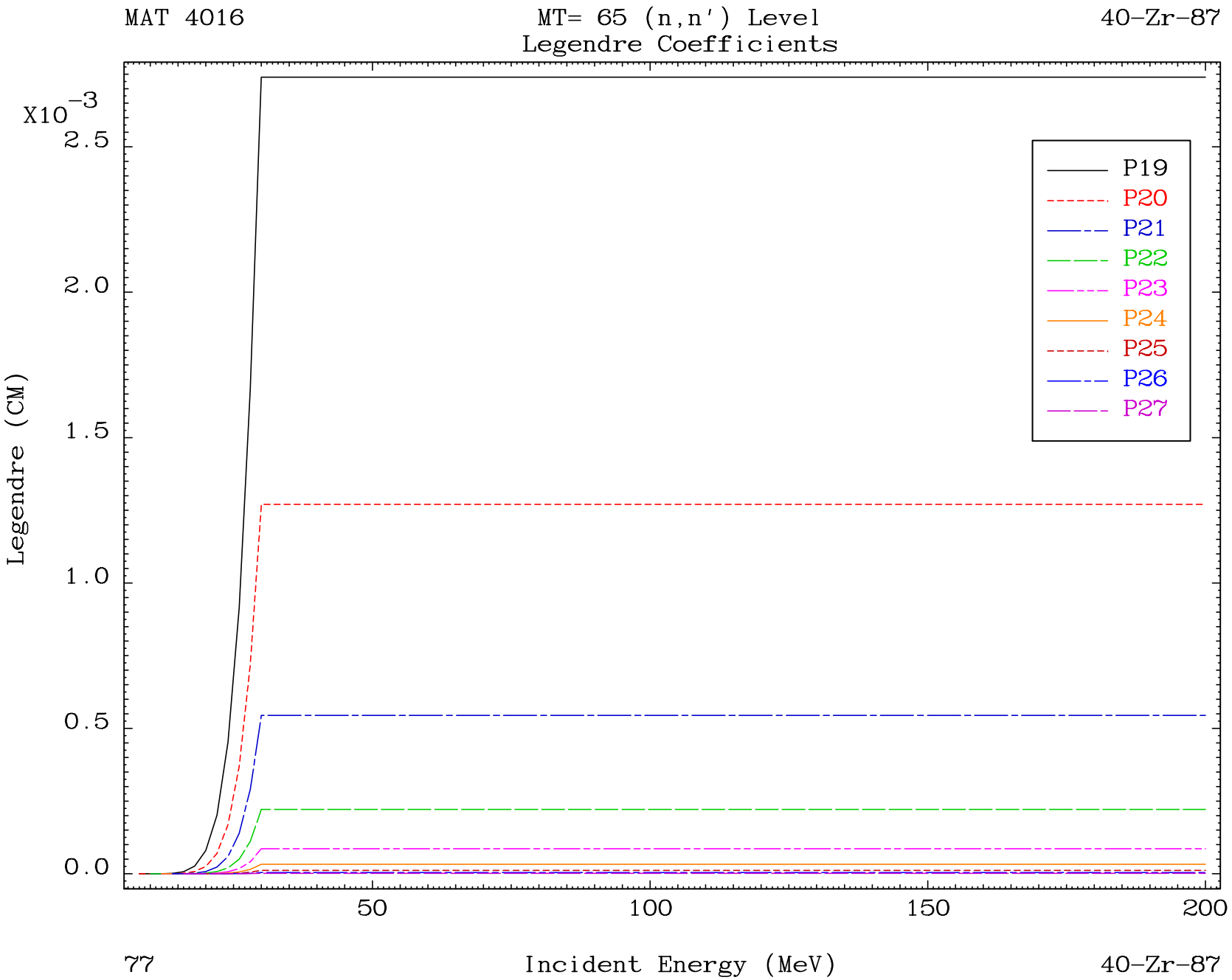

MAT 4016
MT= 64 (n,n') Level
Legendre Coefficients
40-Zr-87
0.03
0.02
0.01
0.00
Legendre (CM)
P10
P11
P12
P13
P14
P15
P16
P17
P18
0
50
100
150
200
72
Incident Energy (MeV)
40-Zr-87

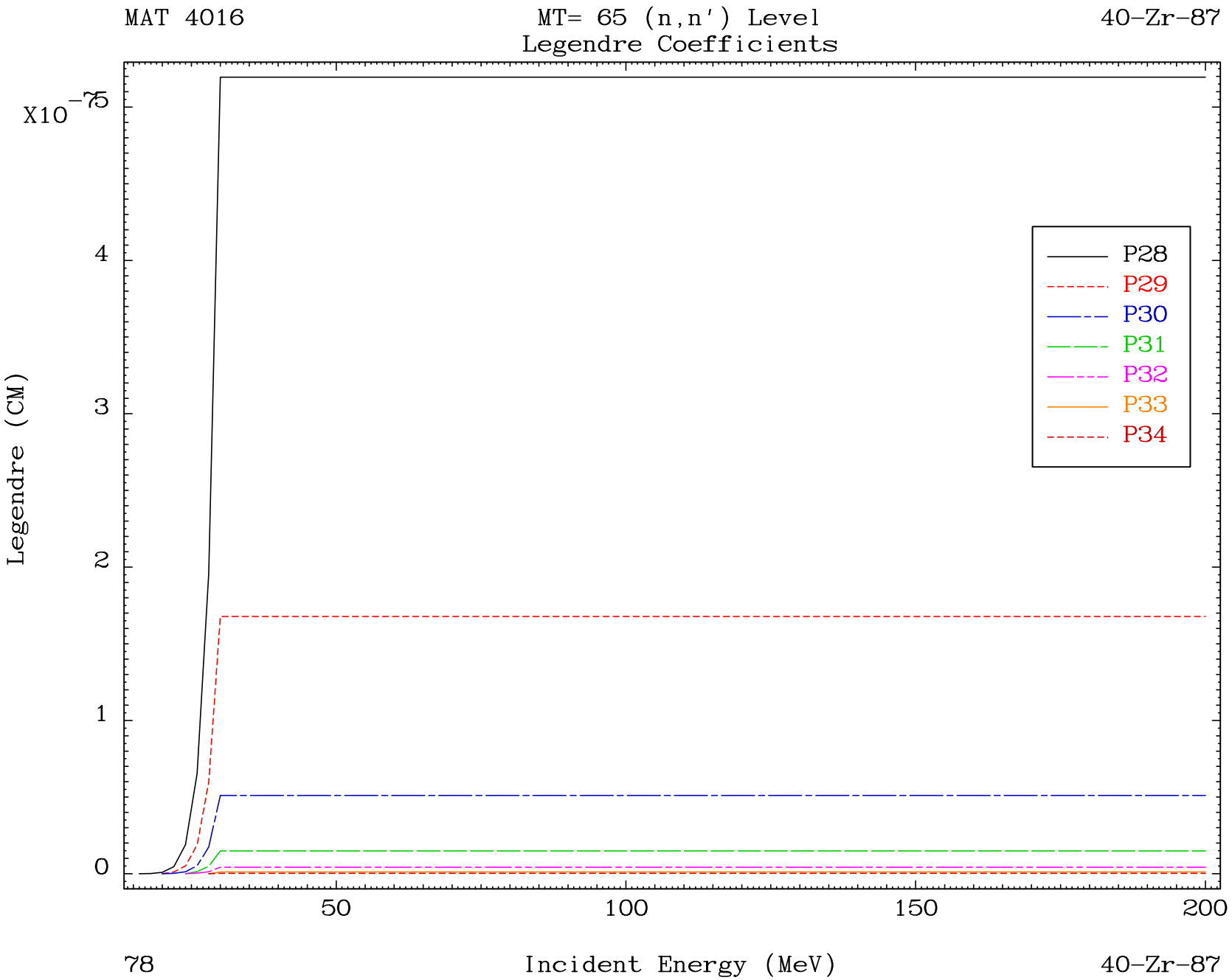

MAT 4016
MT= 64 (n,n') Level
Legendre Coefficients
40-Zr-87
0.0
X10^-3
-0.5
-1.0
-1.5
Legendre (CM)
50
100
150
200
73
Incident Energy (MeV)
40-Zr-87
P19
P20
P21
P22
P23
P24
P25
P26
P27

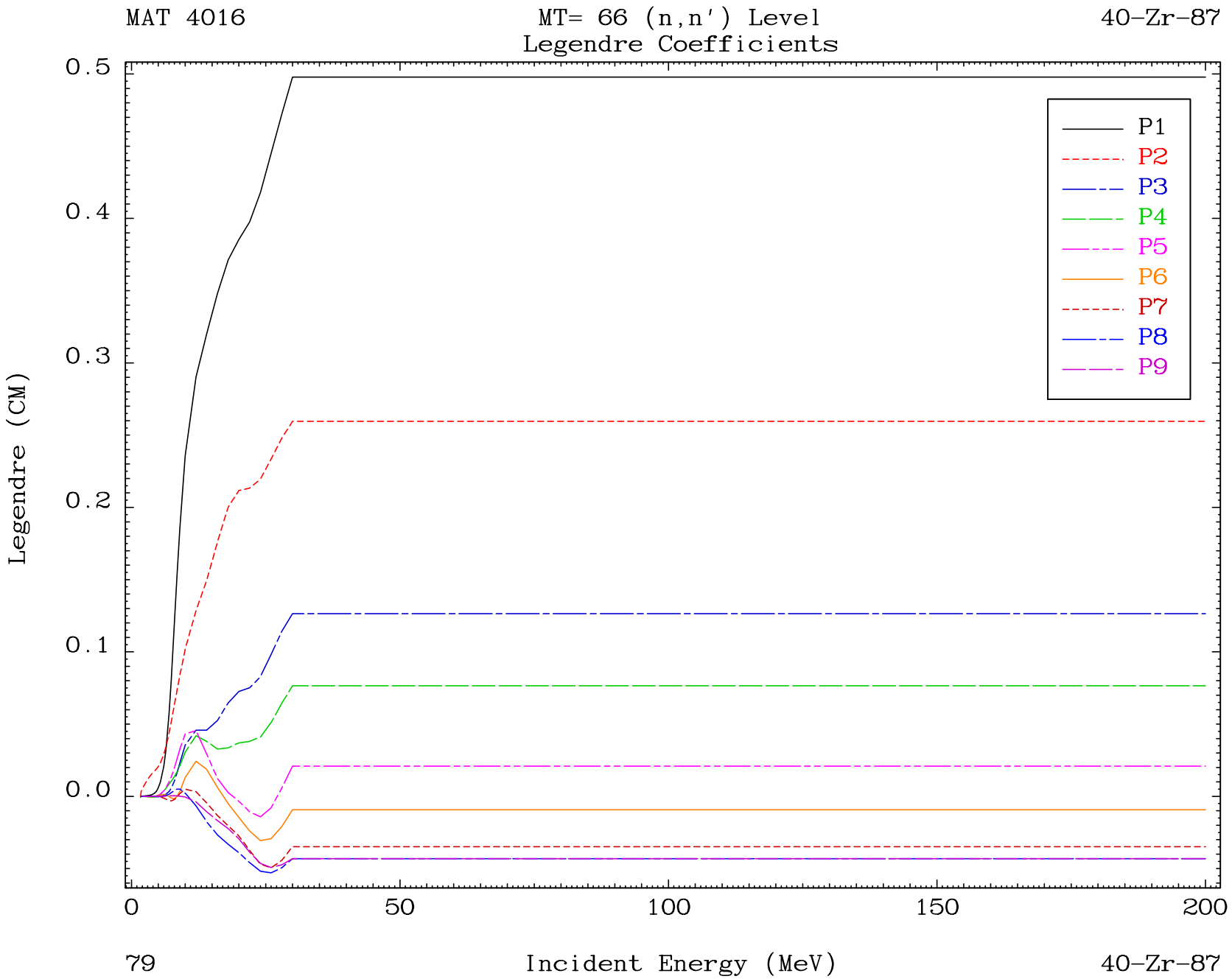

MAT 4016
MT= 64 (n,n') Level
Legendre Coefficients
40-Zr-87
0
X10-7
-1
-2
-3
-4
Legendre (CM)
50
100
150
200
74
Incident Energy (MeV)
40-Zr-87
P28
P29
P30
P31
P32
P33
P34

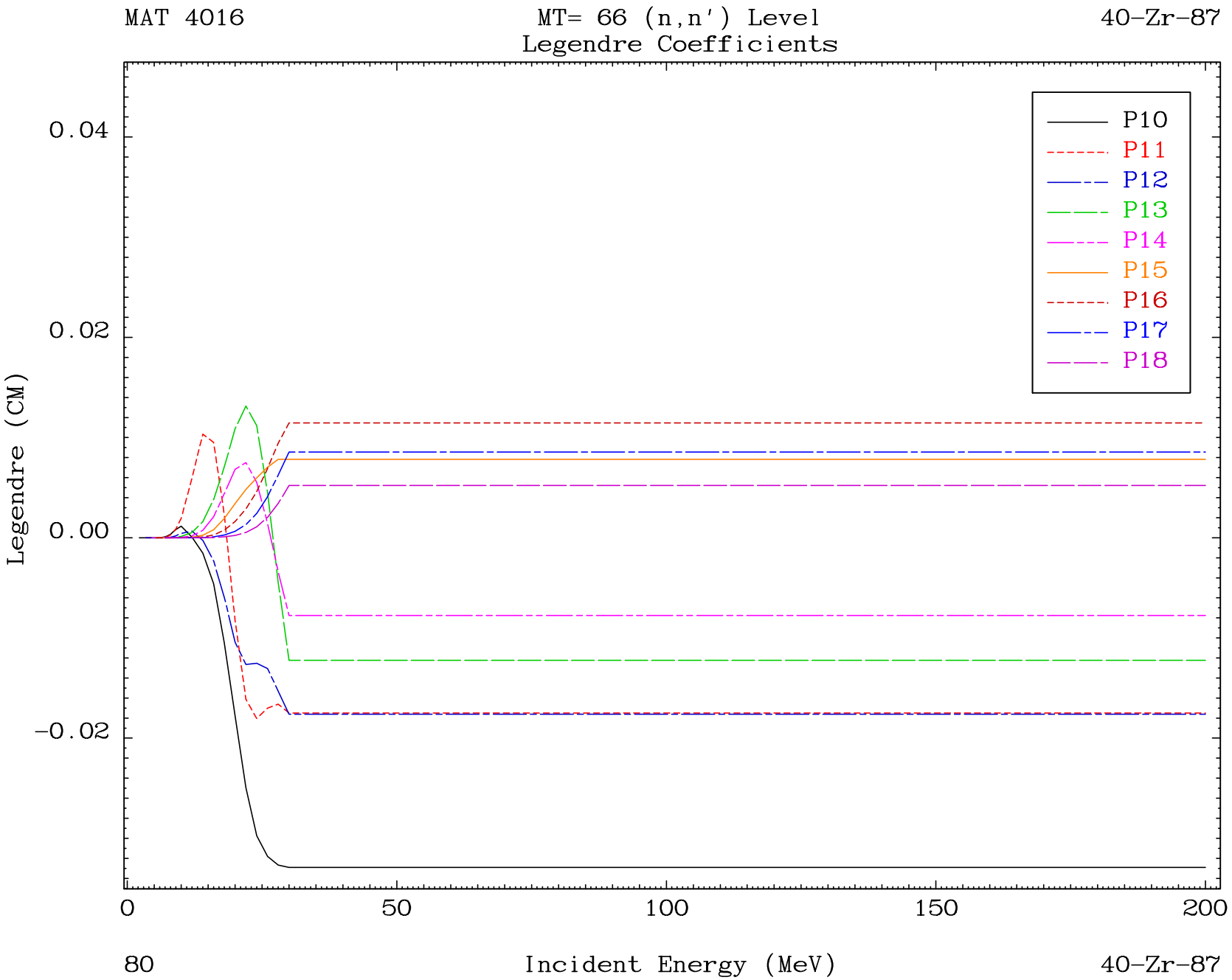

MAT 4016
MT= 65 (n,n') Level
Legendre Coefficients
40-Zr-87
0.5
0.4
0.3
0.2
0.1
0.0
Legendre (CM)
P1
P2
P3
P4
P5
P6
P7
P8
P9
0
50
100
150
200
75
Incident Energy (MeV)
40-Zr-87

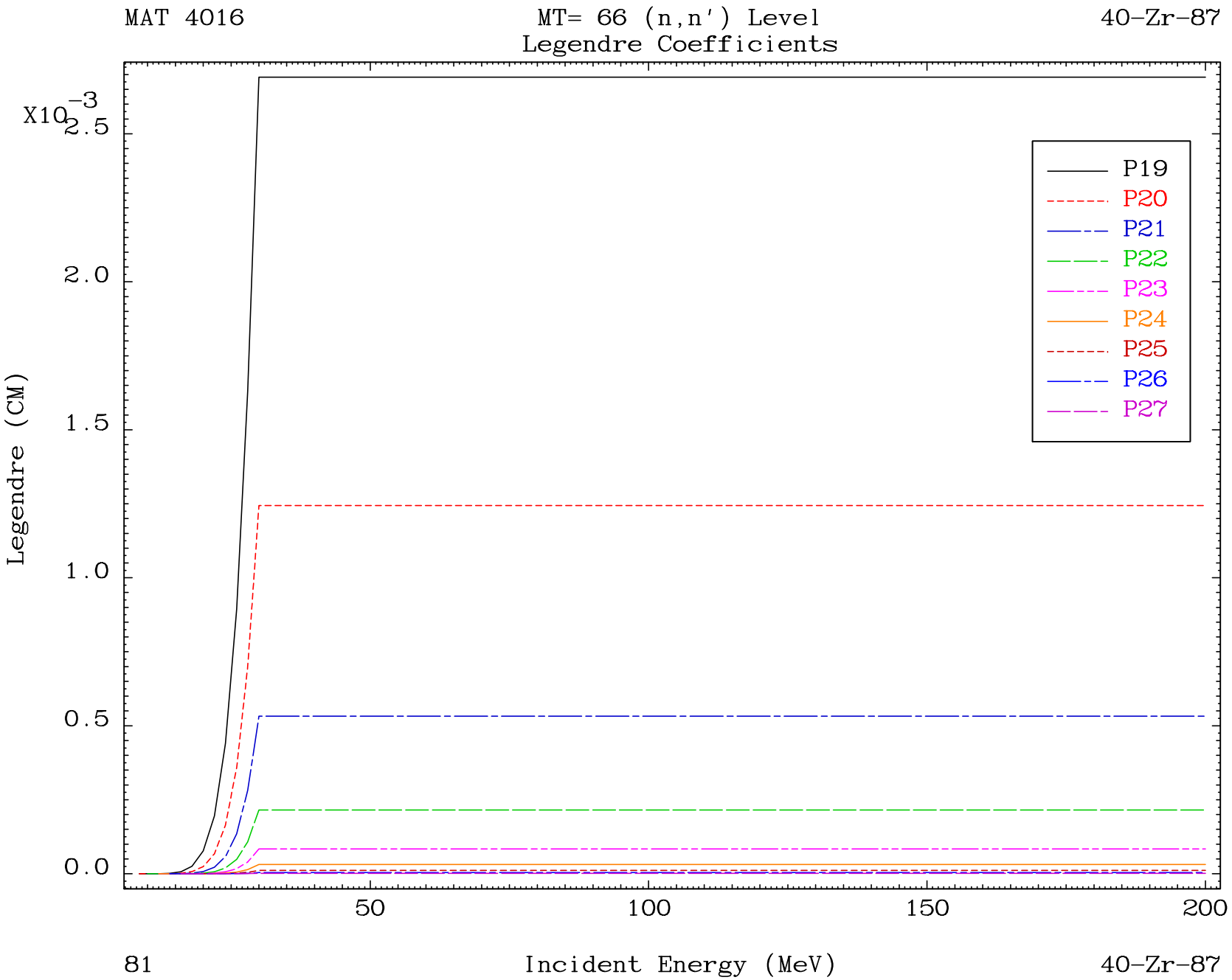

MAT 4016
MT= 65 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.04
0.02
0.00
-0.02
Legendre (CM)
0
50
100
150
200
76
Incident Energy (MeV)
40-Zr-87

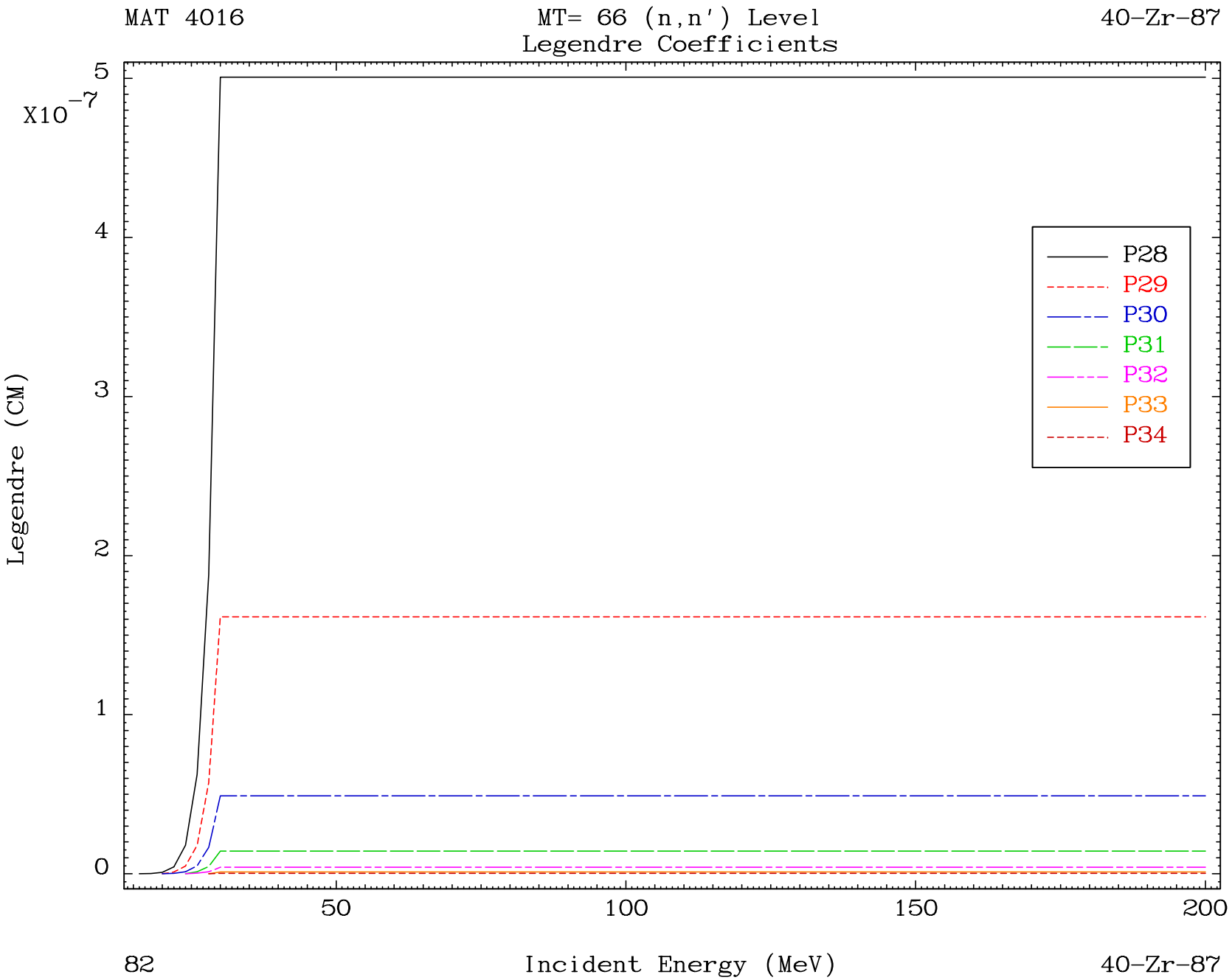

MAT 4016
MT= 65 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-3
2.5
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
77
Incident Energy (MeV)
40-Zr-87

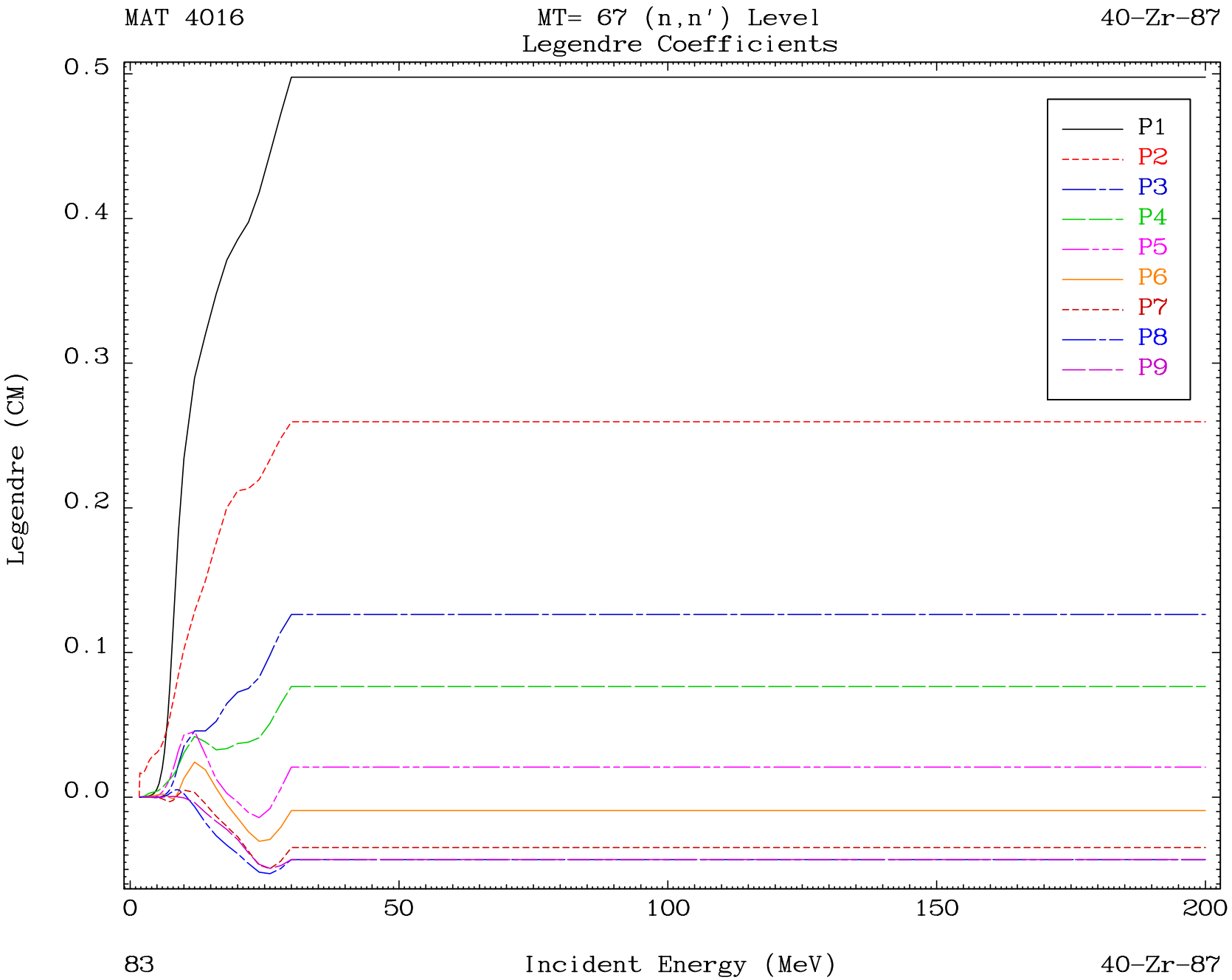

MAT 4016
MT= 65 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-7
5
4
3
2
1
0
Legendre (CM)
50
100
150
200
78
Incident Energy (MeV)
40-Zr-87
P28
P29
P30
P31
P32
P33
P34

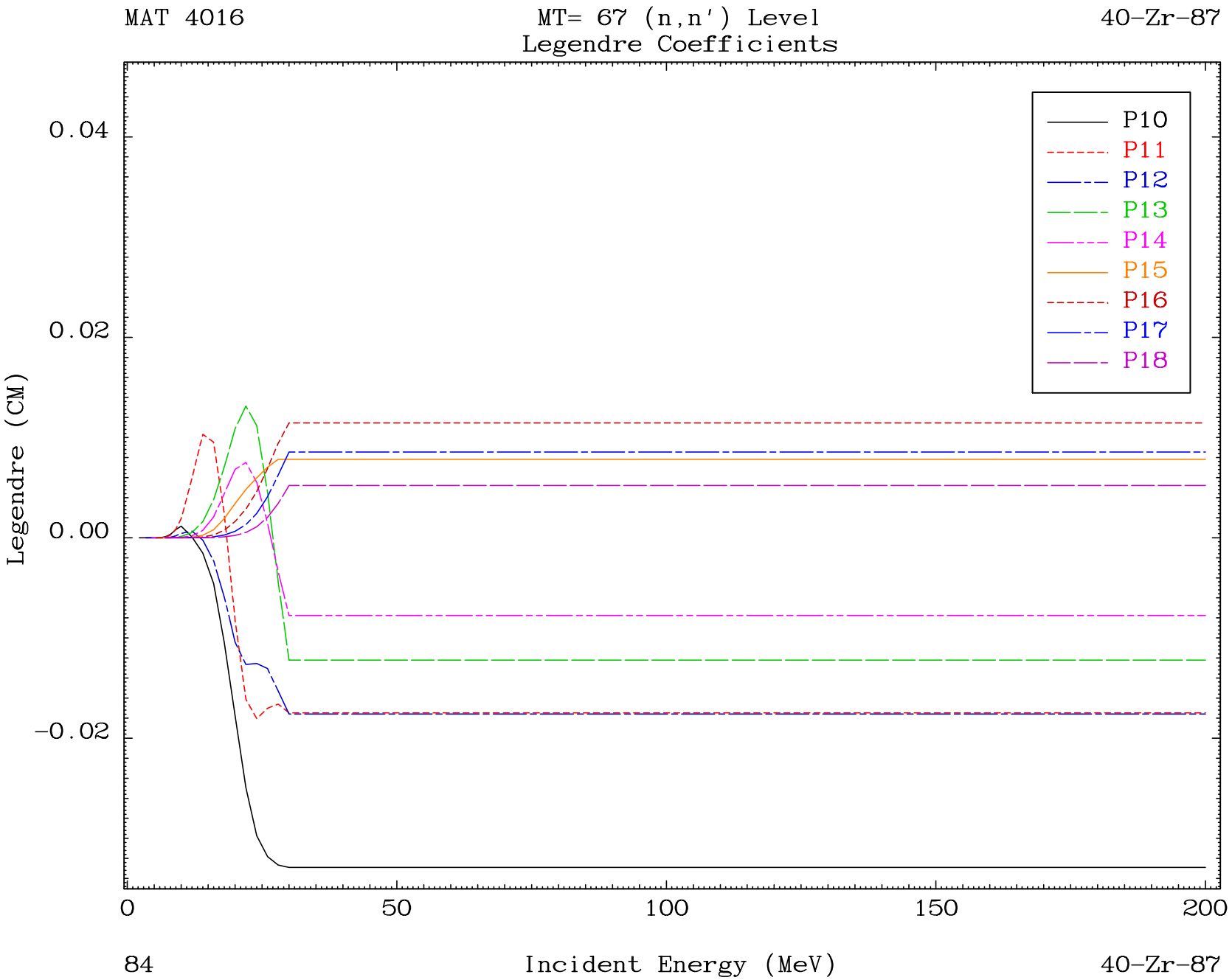

MAT 4016
MT= 66 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.5
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
P1
P2
P3
P4
P5
P6
P7
P8
P9
79
Incident Energy (MeV)
40-Zr-87

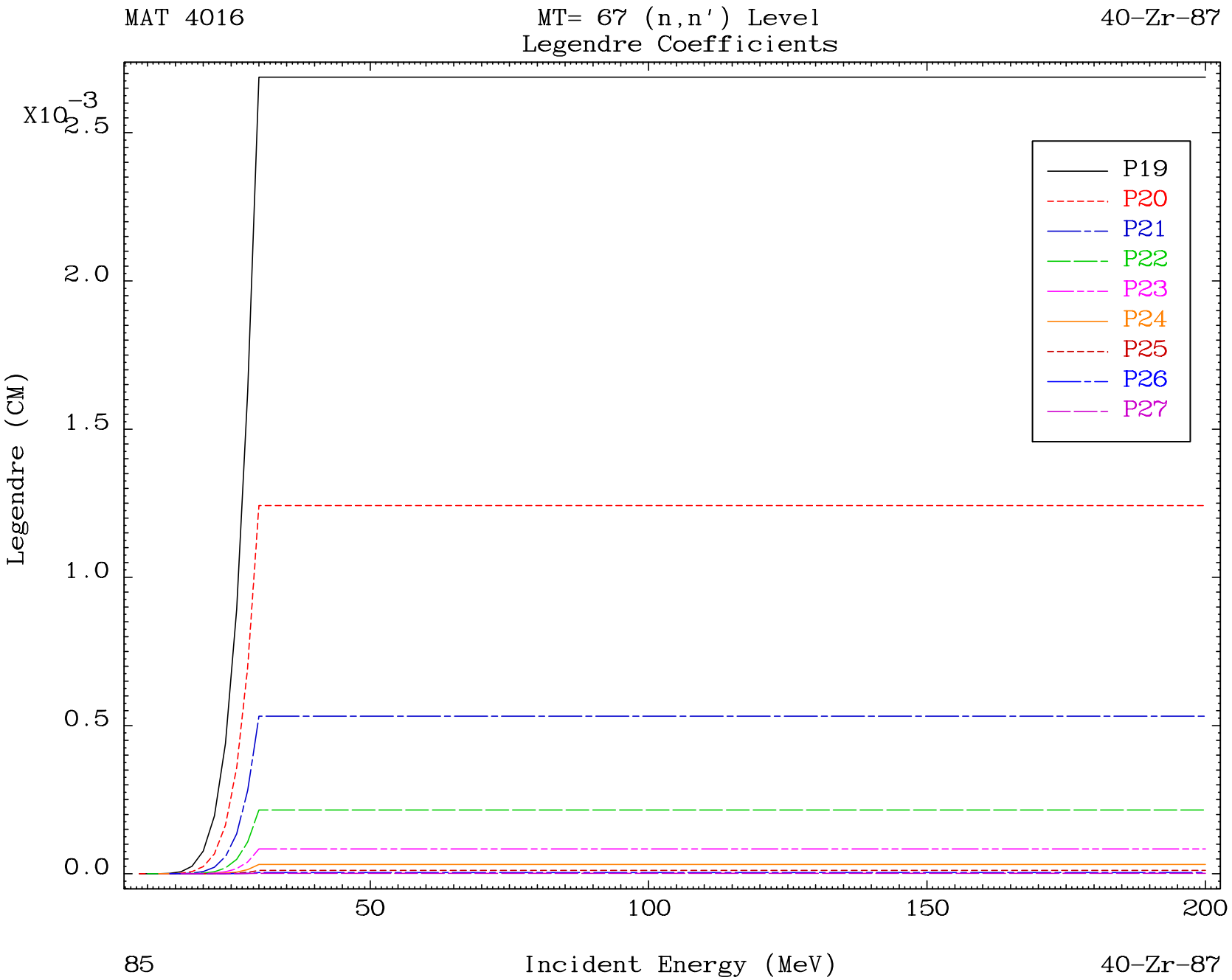

MAT 4016
MT= 66 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.04
0.02
0.00
-0.02
Legendre (CM)
0
50
100
150
200
80
Incident Energy (MeV)
40-Zr-87

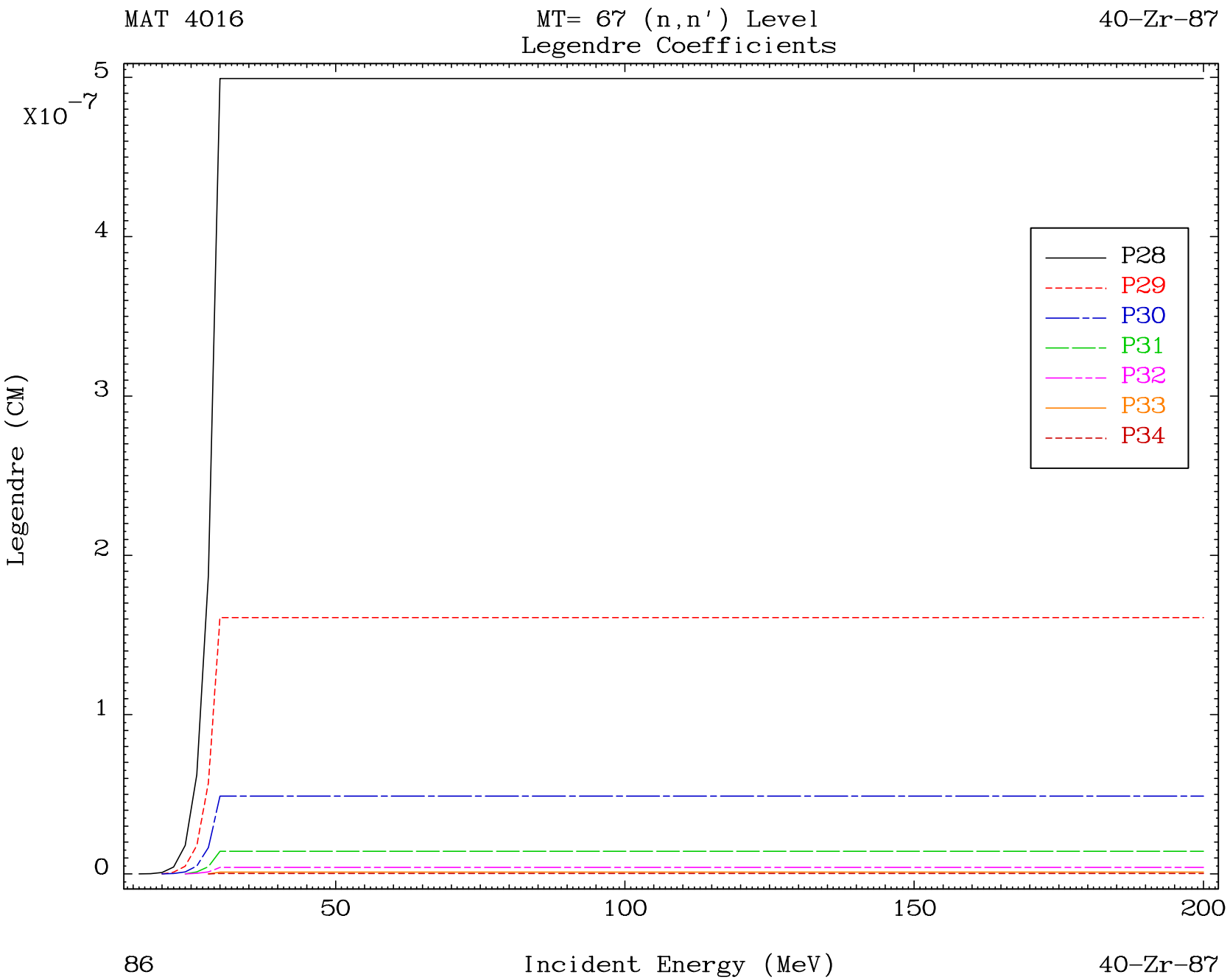

MAT 4016
MT= 66 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-3
2.5
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
81
Incident Energy (MeV)
40-Zr-87

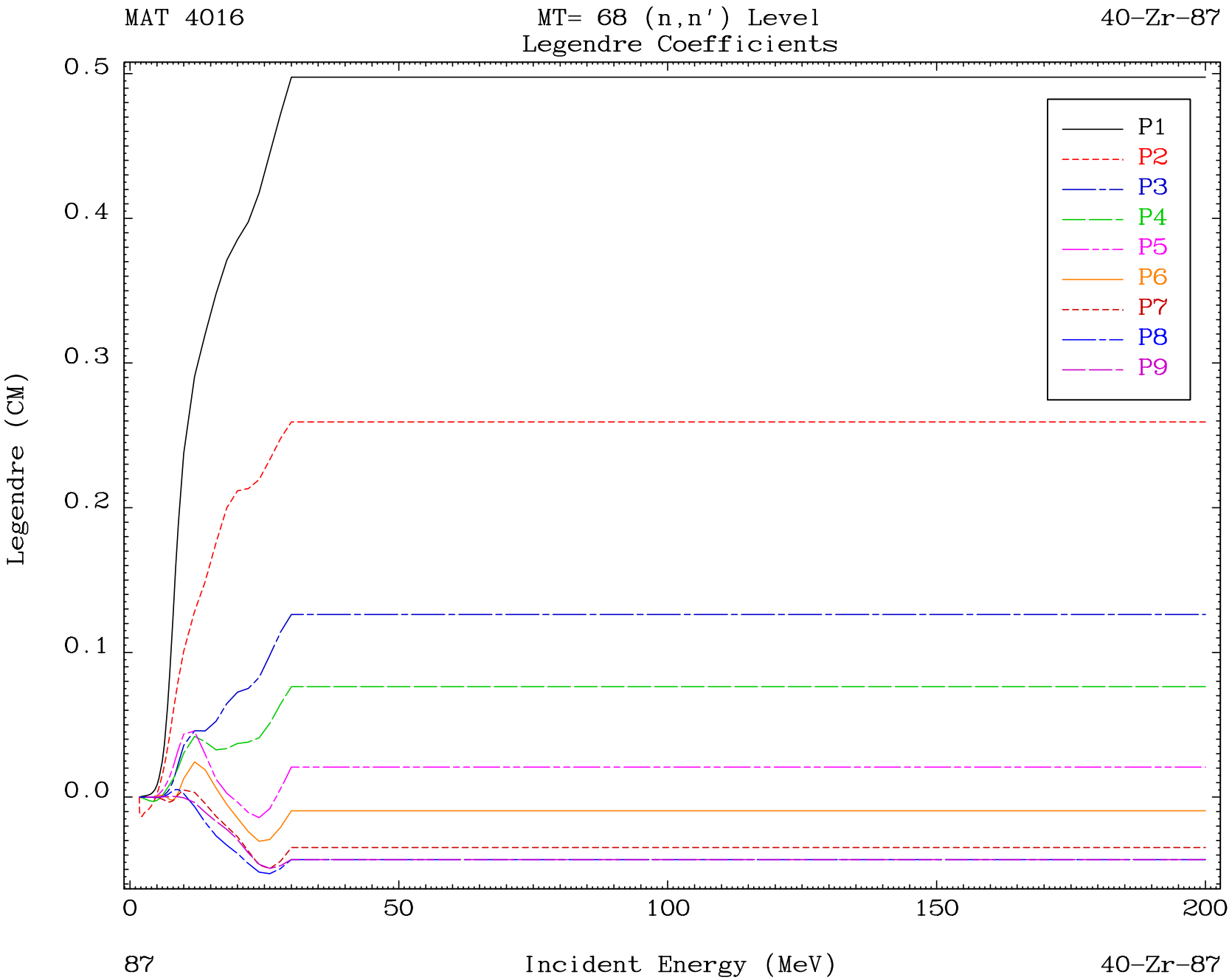

MAT 4016
MT= 66 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-7
5
4
3
2
1
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
82
Incident Energy (MeV)
40-Zr-87

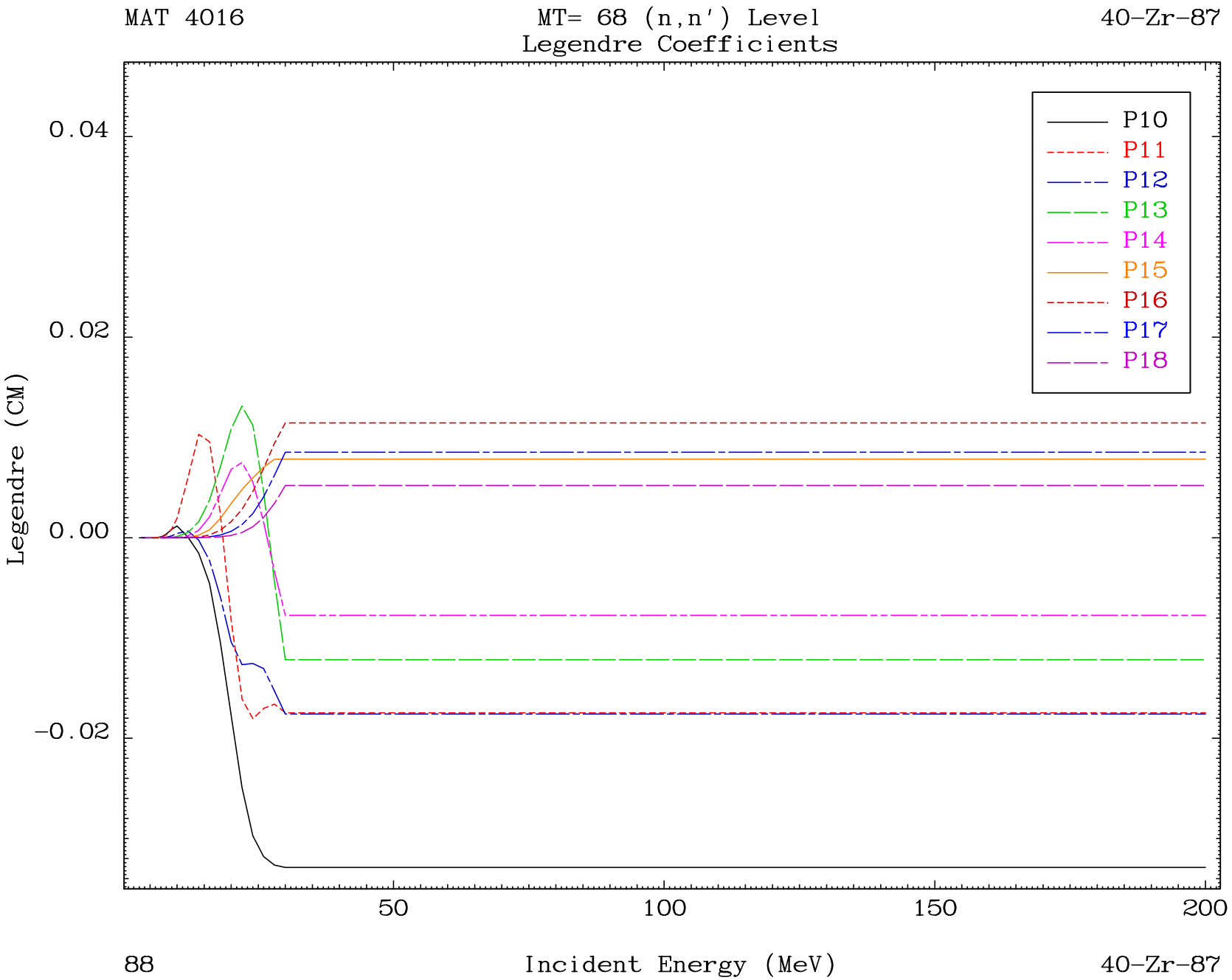

MAT 4016
MT= 67 (n,n') Level
Legendre Coefficients
40-Zr-87
0.5
0.4
0.3
0.2
0.1
0.0
Legendre (CM)
P1
P2
P3
P4
P5
P6
P7
P8
P9
0
50
100
150
200
83
Incident Energy (MeV)
40-Zr-87

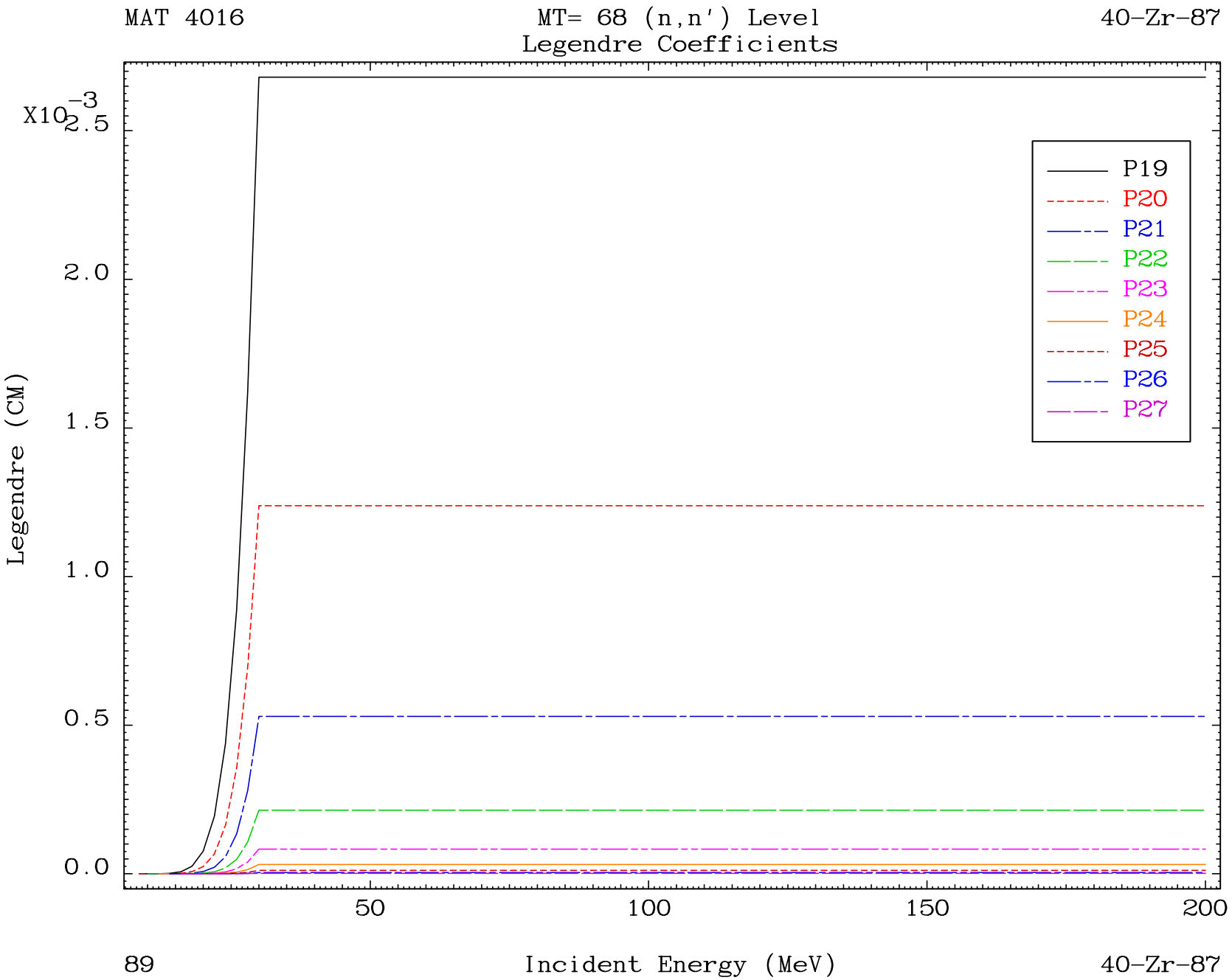

MAT 4016
MT= 67 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.04
0.02
0.00
-0.02
Legendre (CM)
0
50
100
150
200
84
Incident Energy (MeV)
40-Zr-87

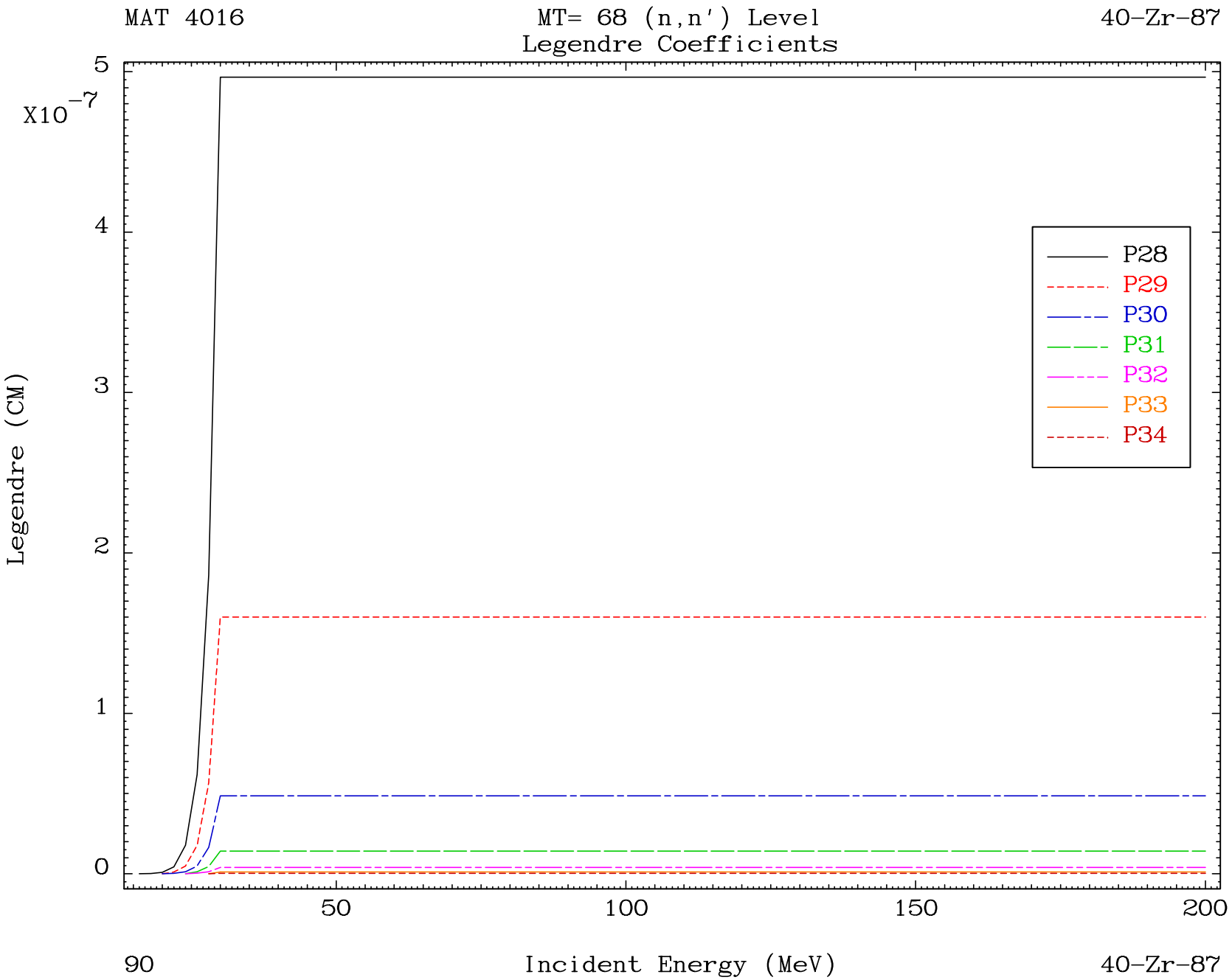

MAT 4016
MT= 67 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-3
2.5
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
85
Incident Energy (MeV)
40-Zr-87

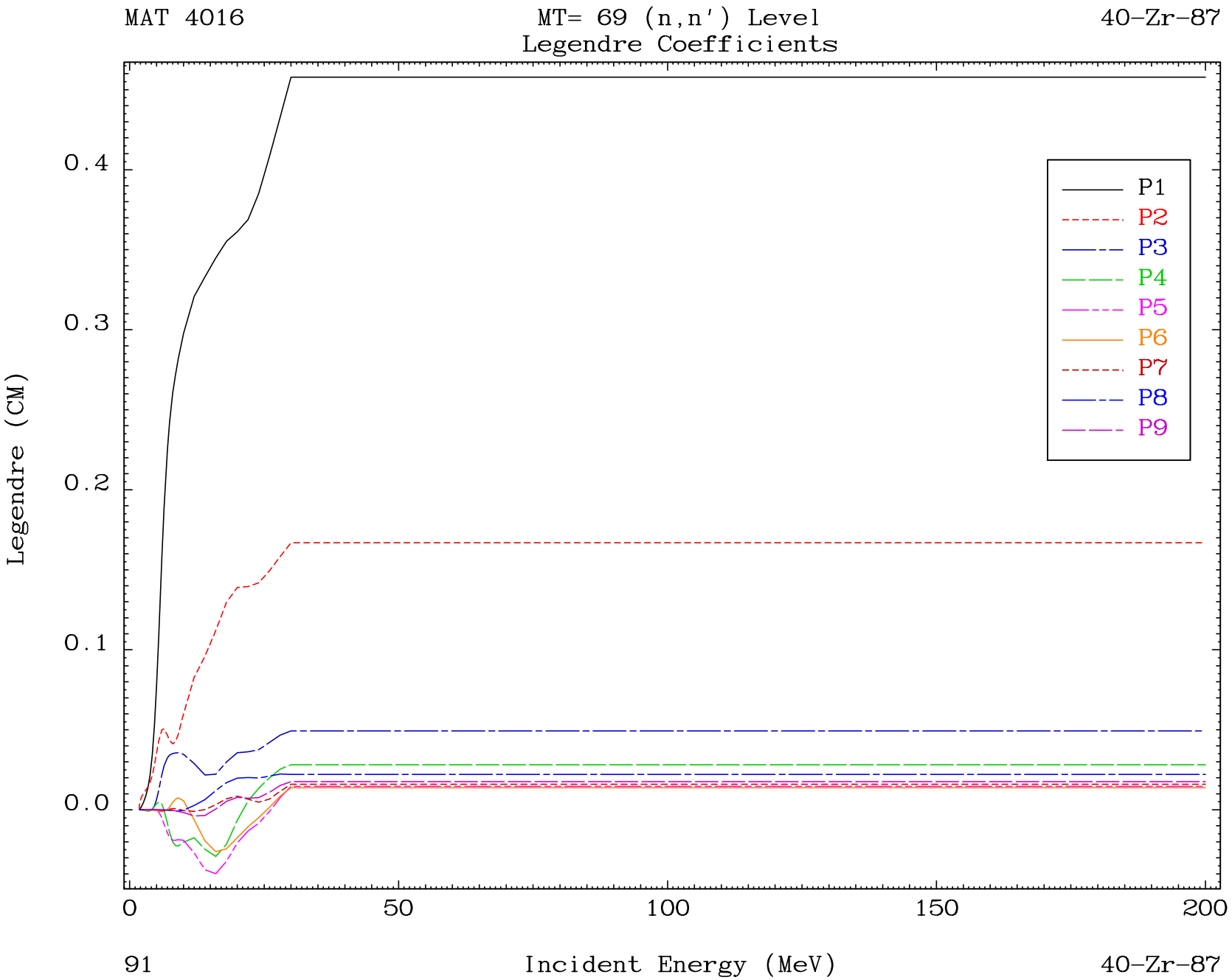

MAT 4016
MT= 67 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-7
5
4
3
2
1
0
Legendre (CM)
50
100
150
200
86
Incident Energy (MeV)
40-Zr-87
P28
P29
P30
P31
P32
P33
P34

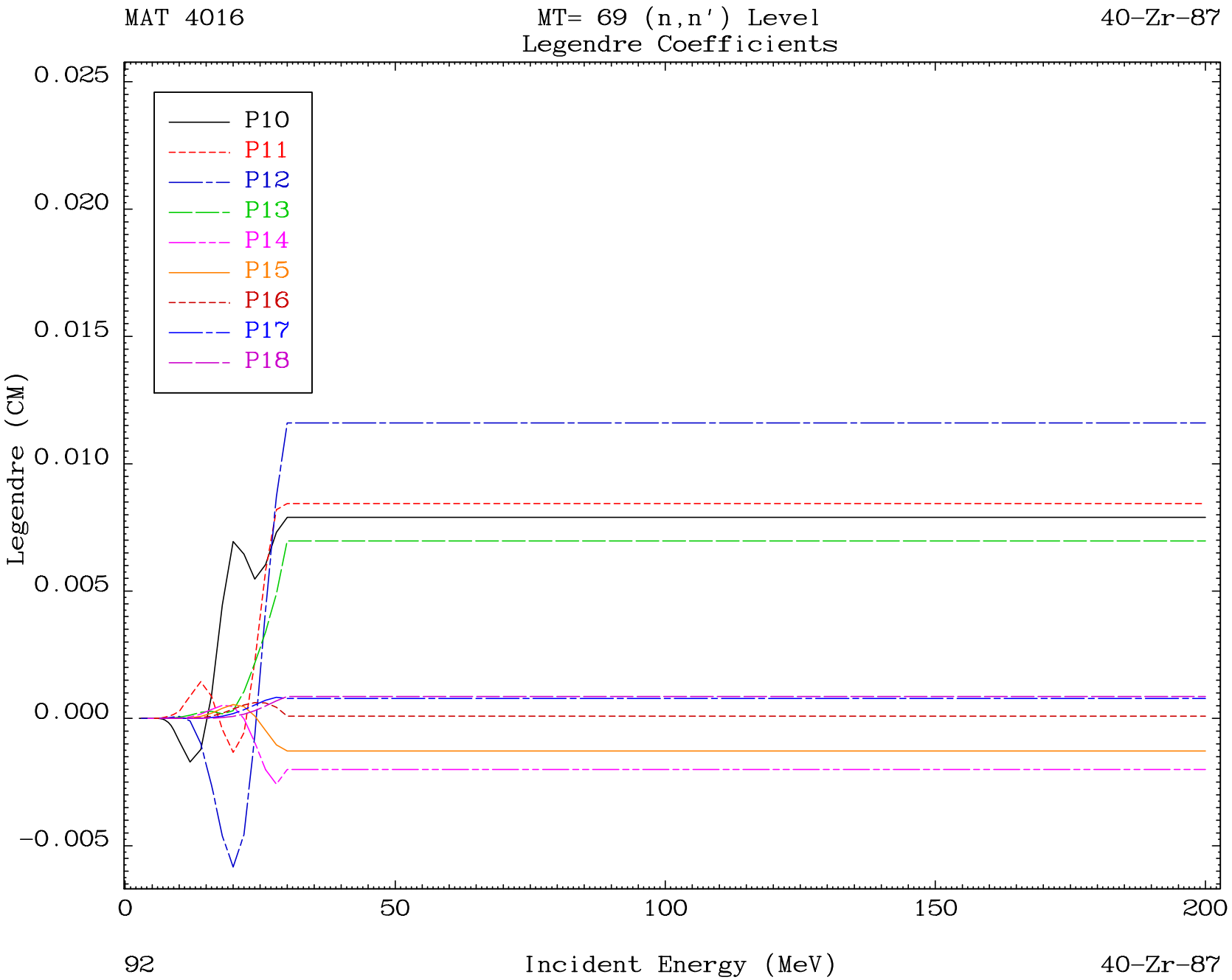

MAT 4016
MT= 68 (n,n') Level
Legendre Coefficients
40-Zr-87
0.5
0.4
0.3
0.2
0.1
0.0
Legendre (CM)
P1
P2
P3
P4
P5
P6
P7
P8
P9
0
50
100
150
200
87
Incident Energy (MeV)
40-Zr-87

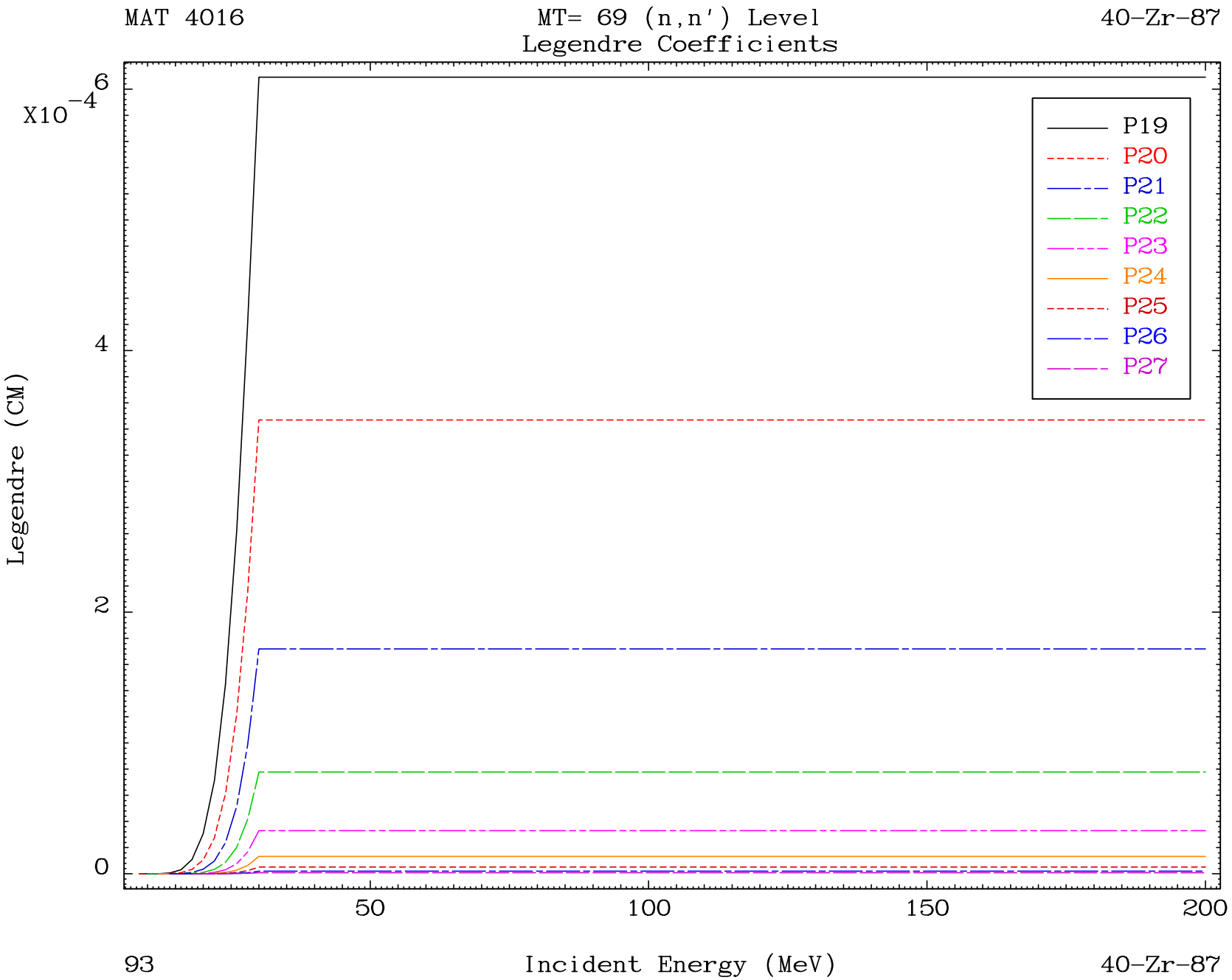

MAT 4016
MT= 68 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.04
0.02
0.00
-0.02
Legendre (CM)
50
100
150
200
88
Incident Energy (MeV)
40-Zr-87

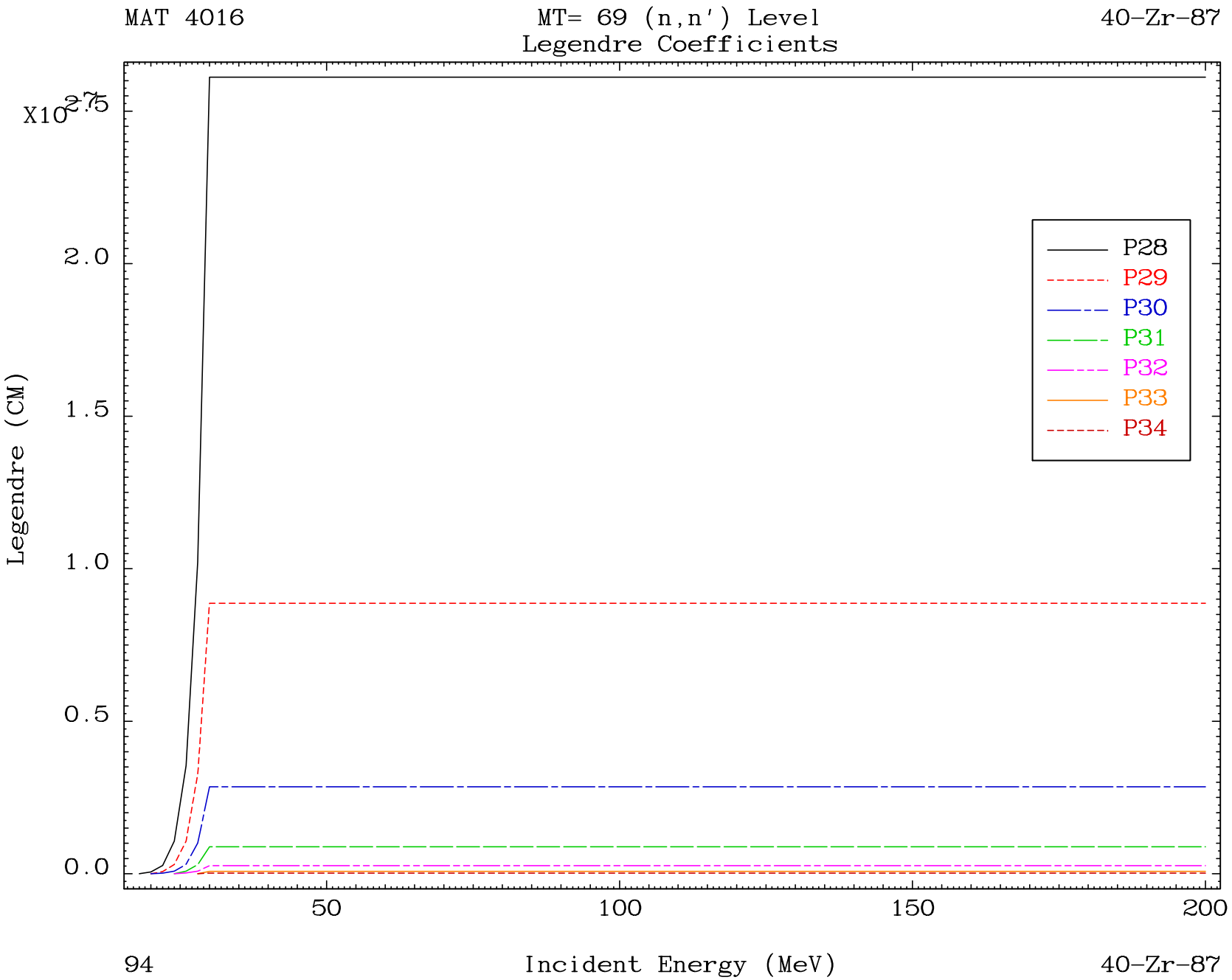

MAT 4016
MT= 68 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-3
2.5
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
89
Incident Energy (MeV)
40-Zr-87

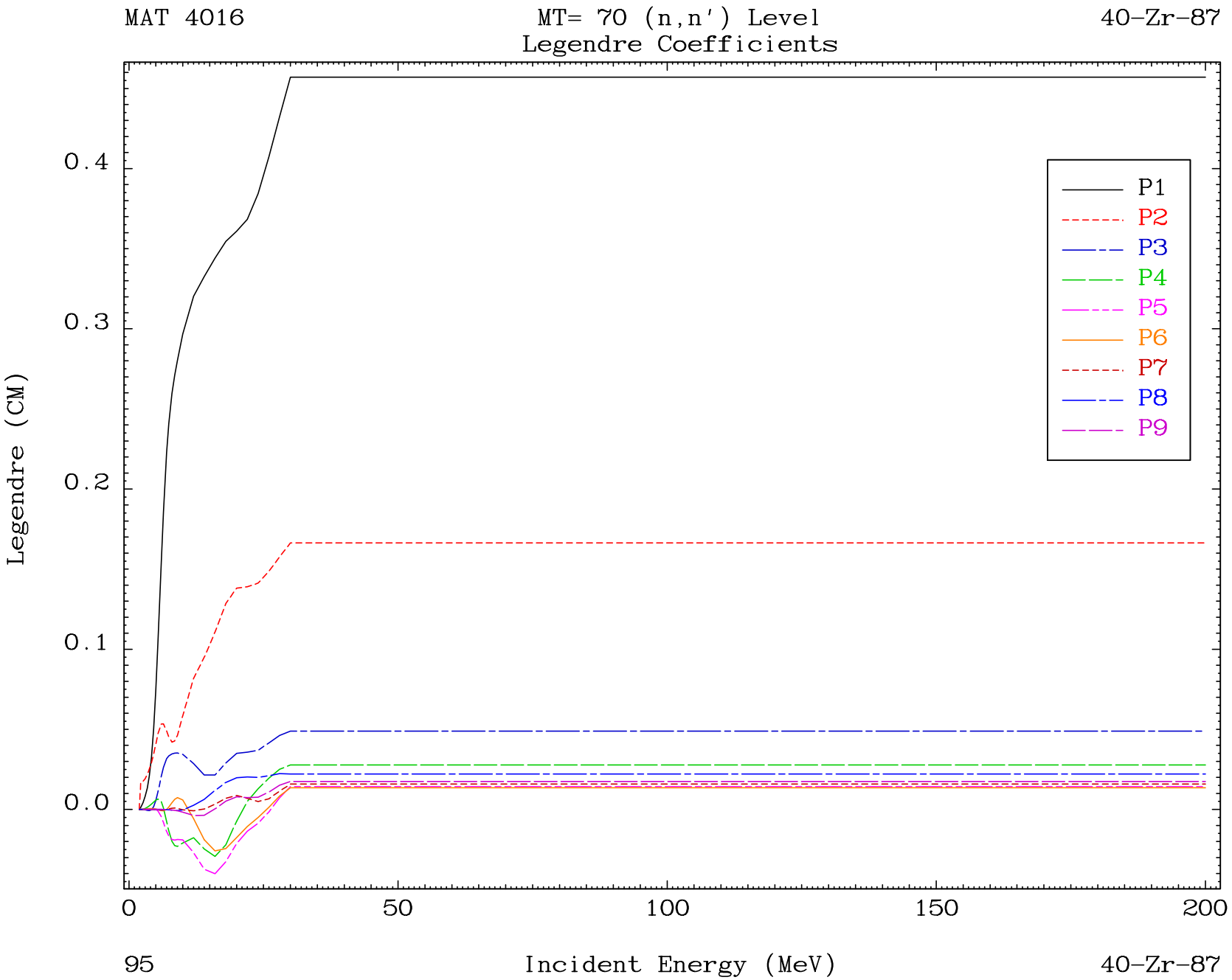

MAT 4016
MT= 68 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-7
5
4
3
2
1
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
90
Incident Energy (MeV)
40-Zr-87

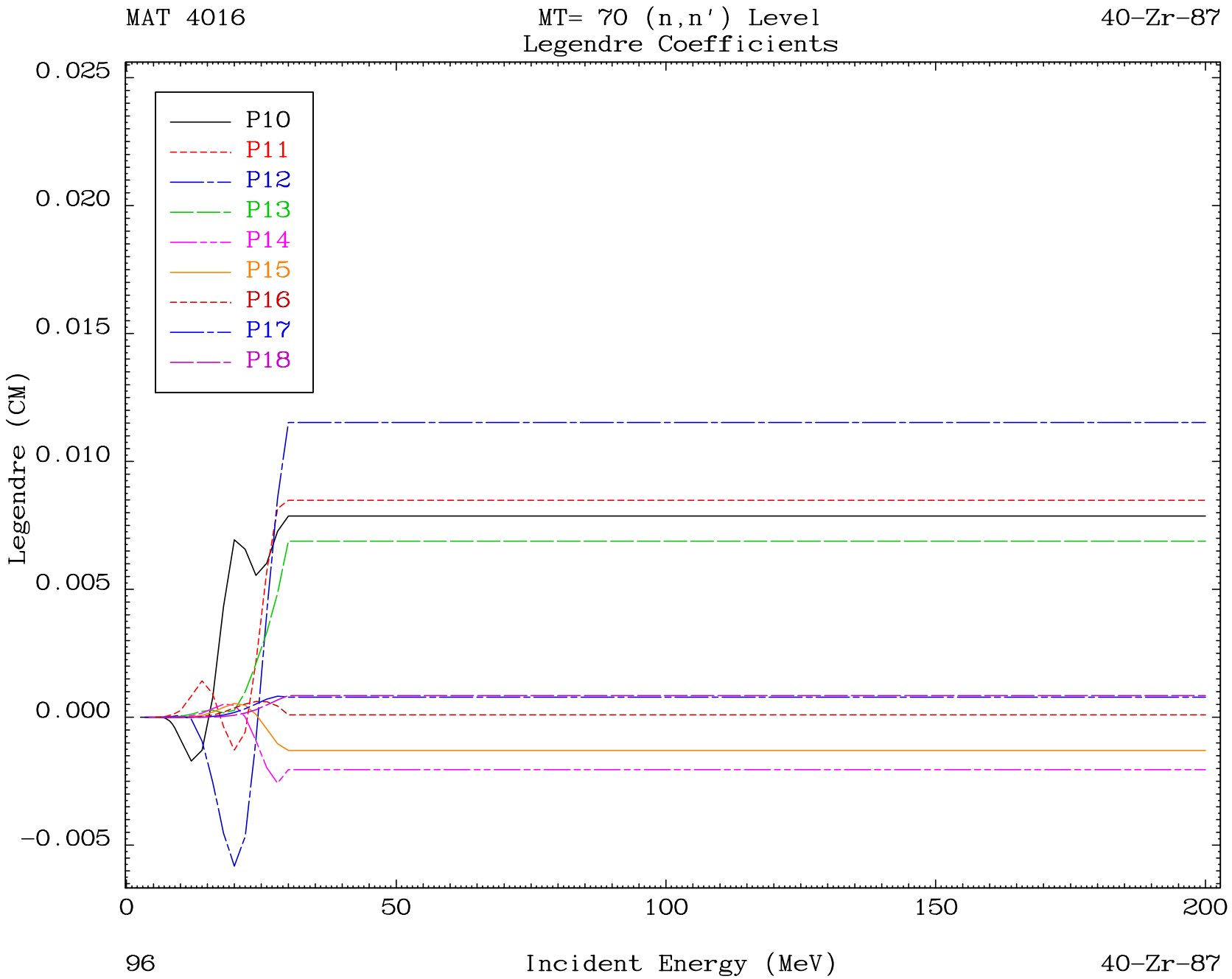

MAT 4016
MT= 69 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
P1
P2
P3
P4
P5
P6
P7
P8
P9
91
Incident Energy (MeV)
40-Zr-87

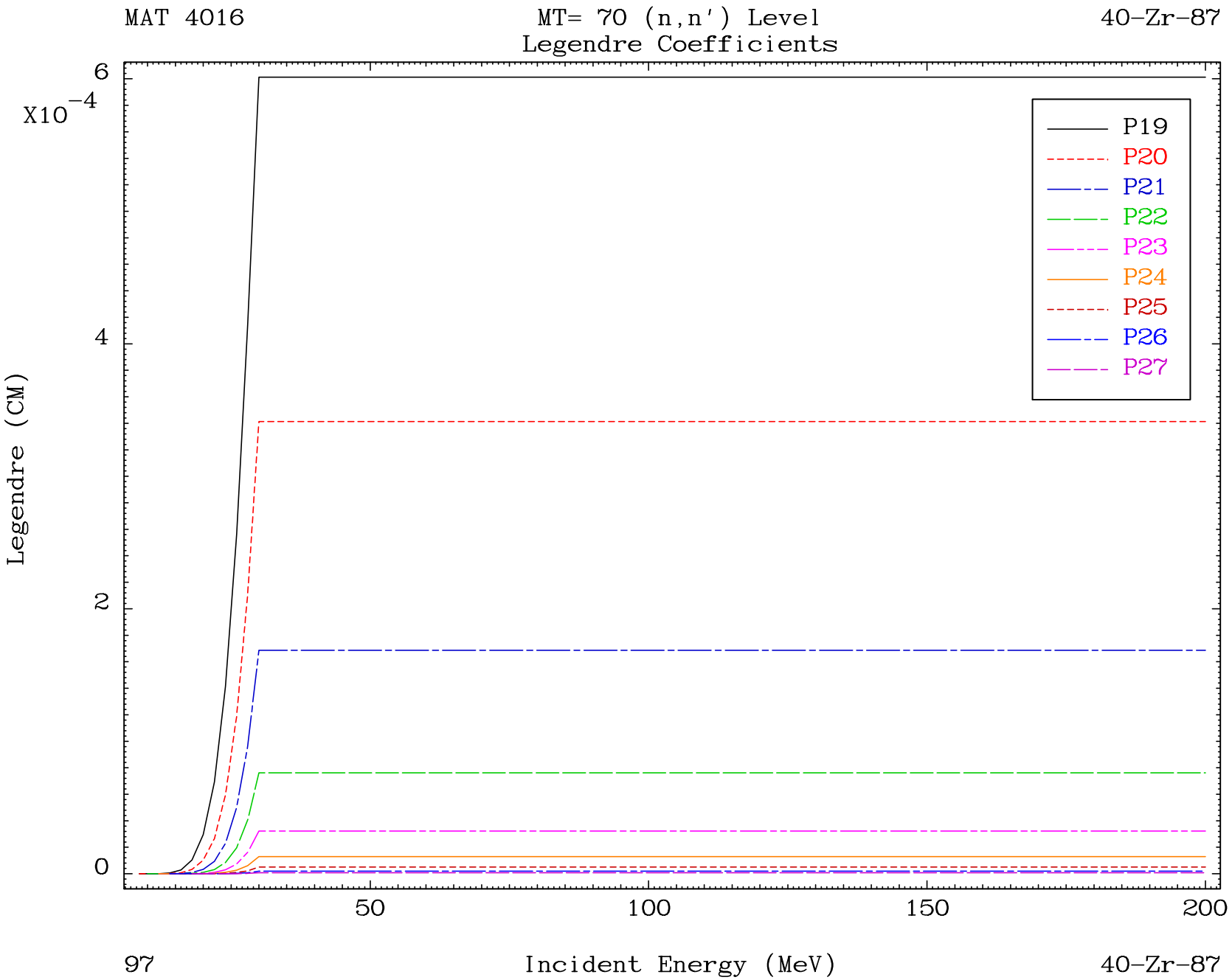

MAT 4016
MT= 69 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
Legendre (CM)
0
50
100
150
200
92
Incident Energy (MeV)
40-Zr-87

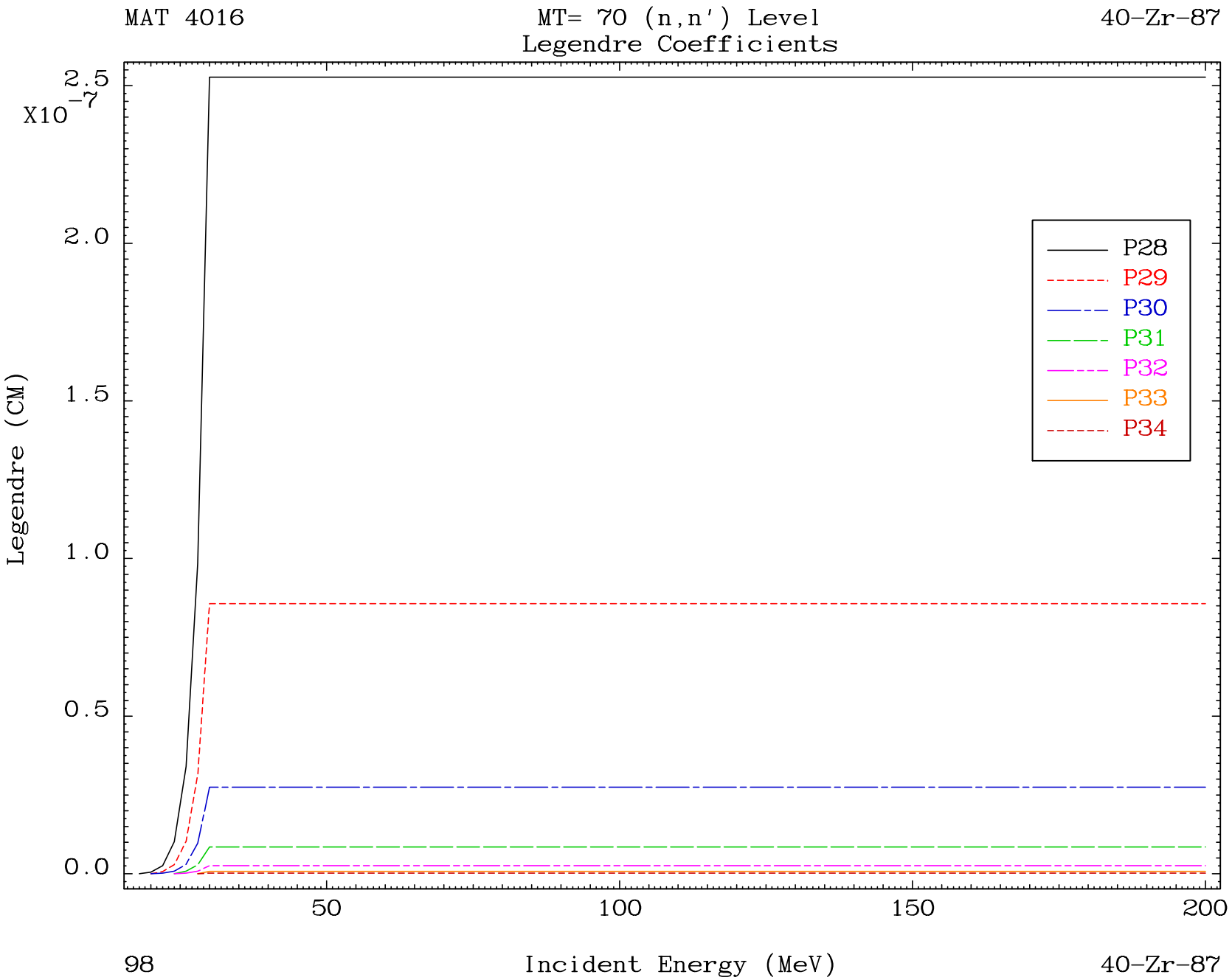

MAT 4016
MT= 69 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-4
6
4
2
0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
93
Incident Energy (MeV)
40-Zr-87

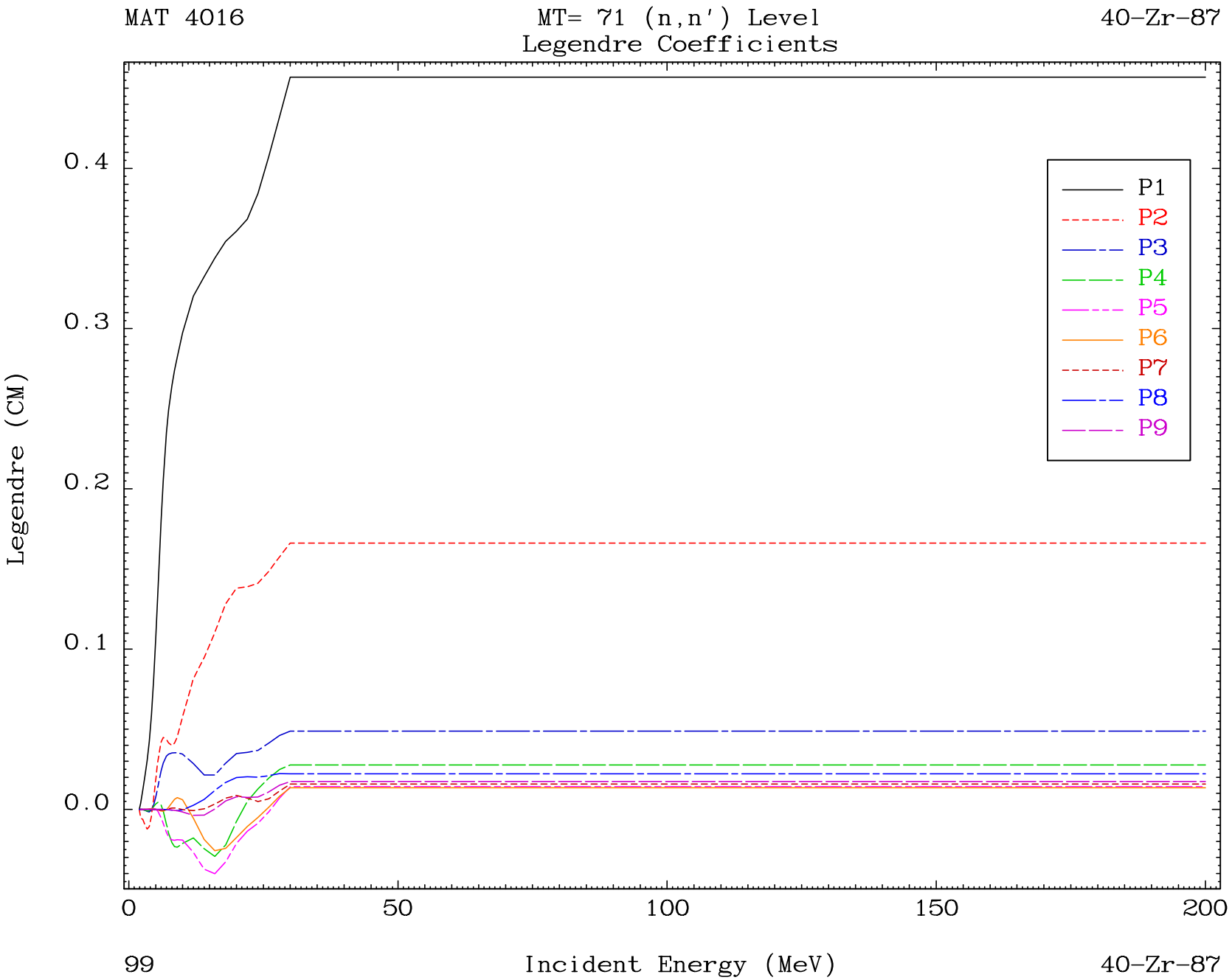

MAT 4016
MT= 69 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-27
2.5
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
50
100
150
200
94
Incident Energy (MeV)
40-Zr-87
P28
P29
P30
P31
P32
P33
P34

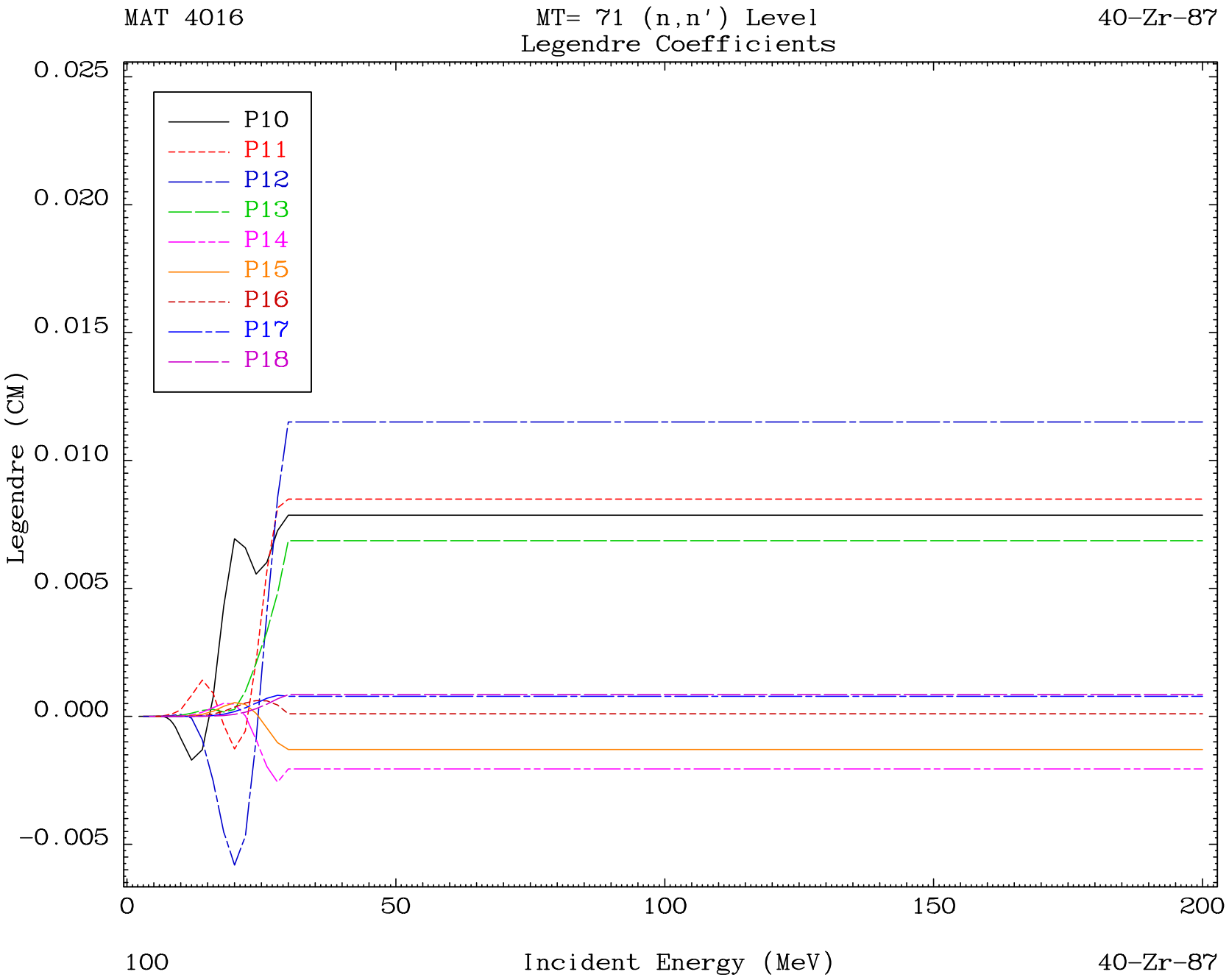

MAT 4016
MT= 70 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
P1
P2
P3
P4
P5
P6
P7
P8
P9
0
50
100
150
200
95
Incident Energy (MeV)
40-Zr-87

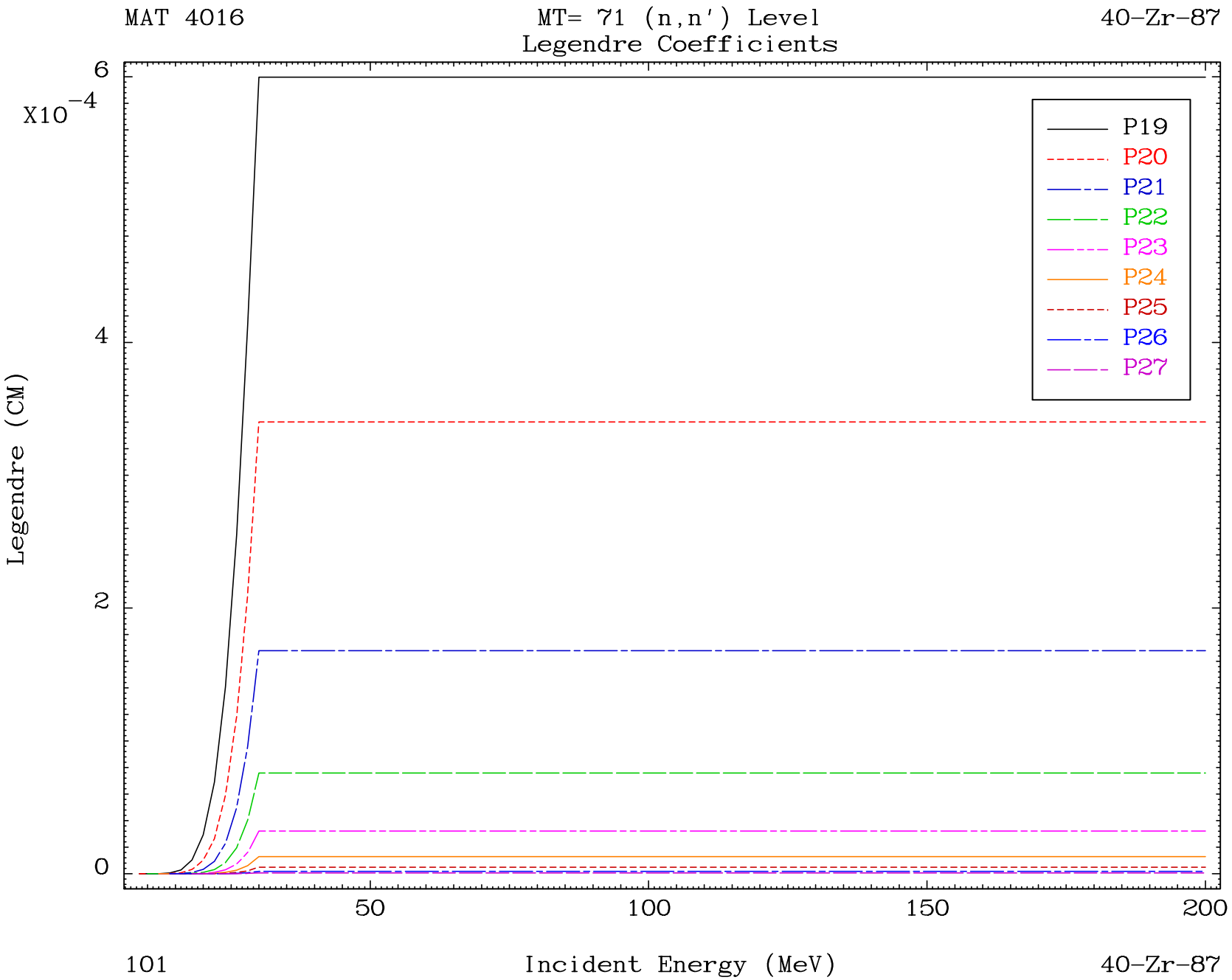

MAT 4016
MT= 70 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
Legendre (CM)
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
0
50
100
150
200
96
Incident Energy (MeV)
40-Zr-87

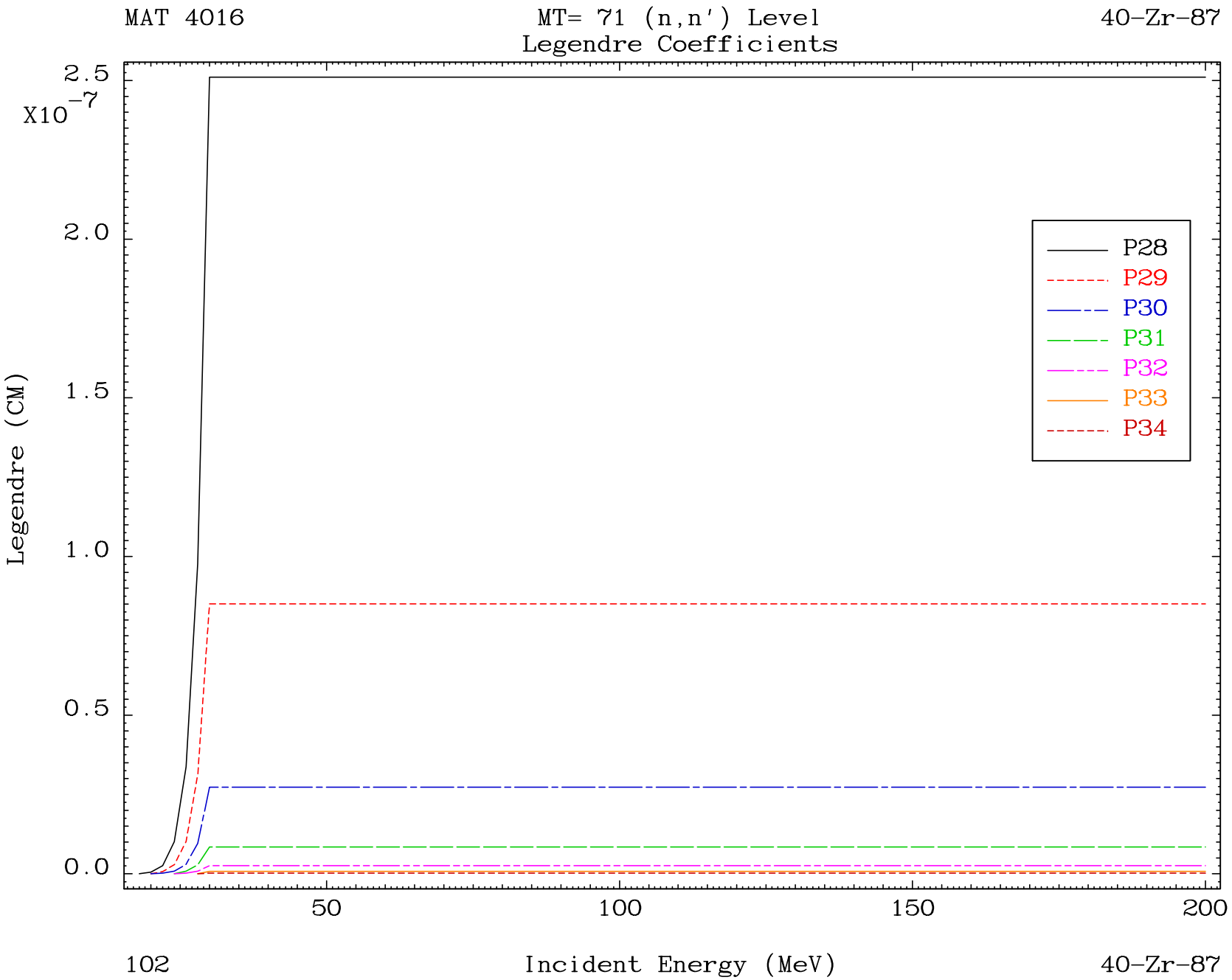

MAT 4016
MT= 70 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-4
6
4
2
0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
97
Incident Energy (MeV)
40-Zr-87

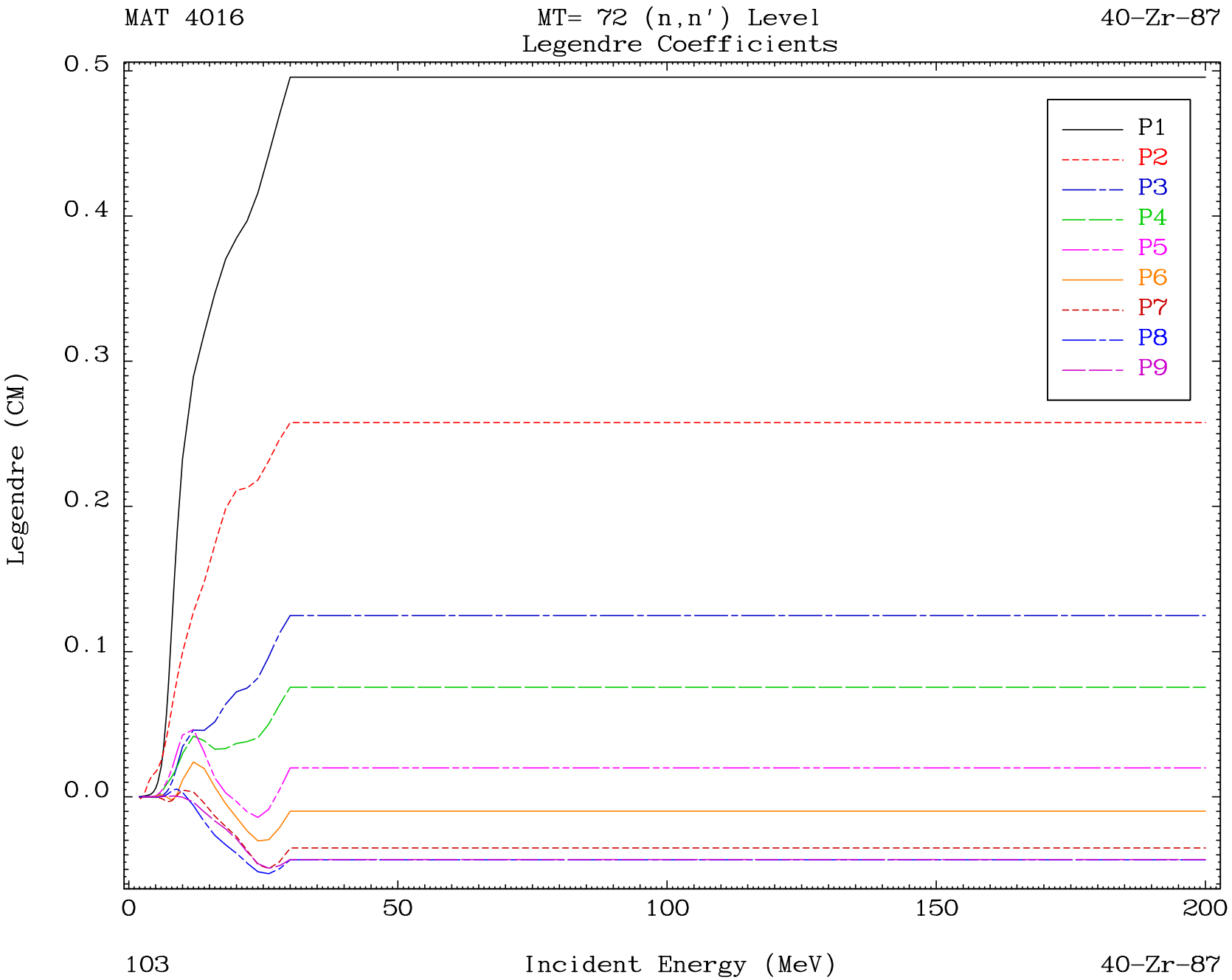

MAT 4016
MT= 70 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-7
2.5
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
98
Incident Energy (MeV)
40-Zr-87

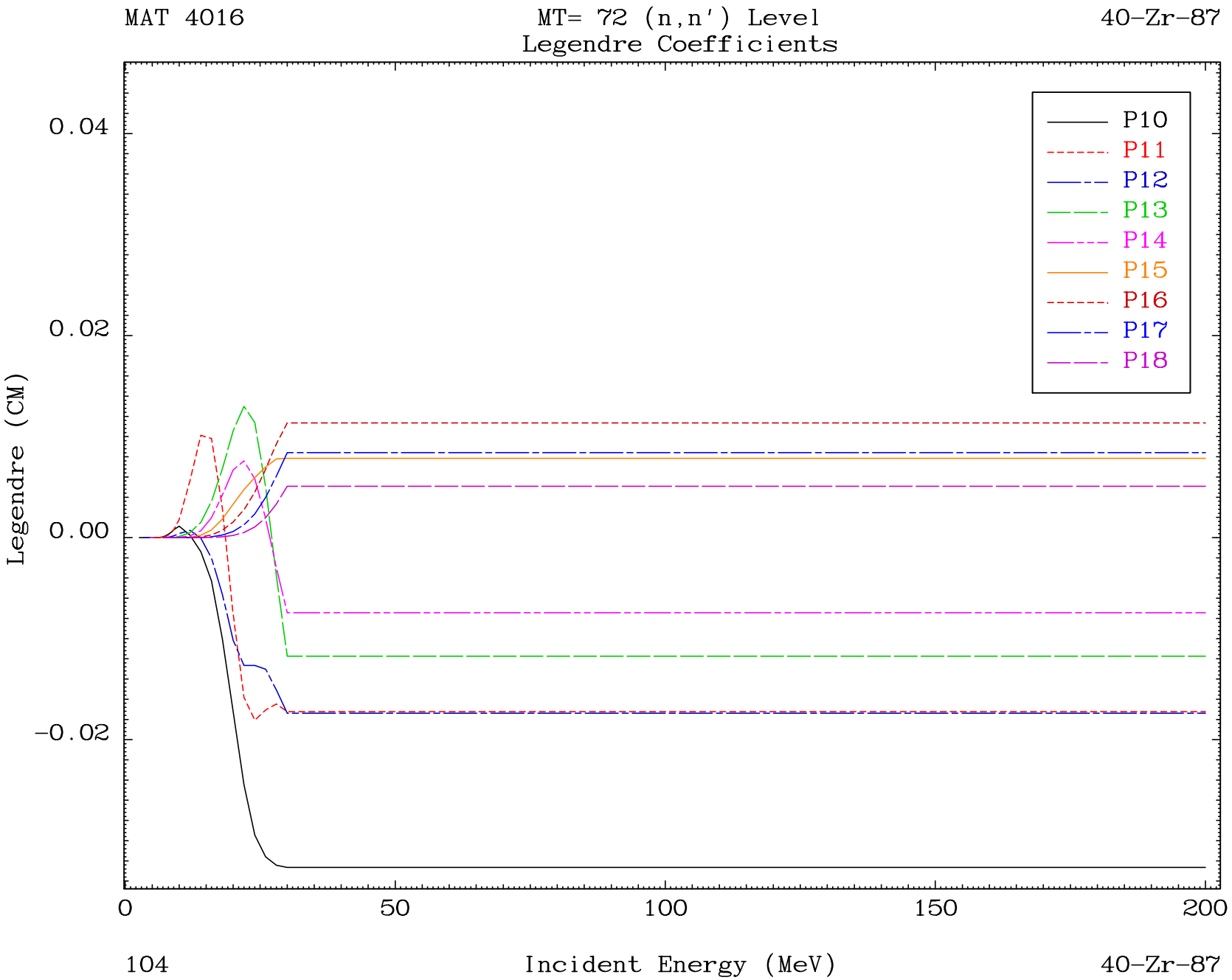

MAT 4016
MT= 71 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
P1
P2
P3
P4
P5
P6
P7
P8
P9
99
Incident Energy (MeV)
40-Zr-87

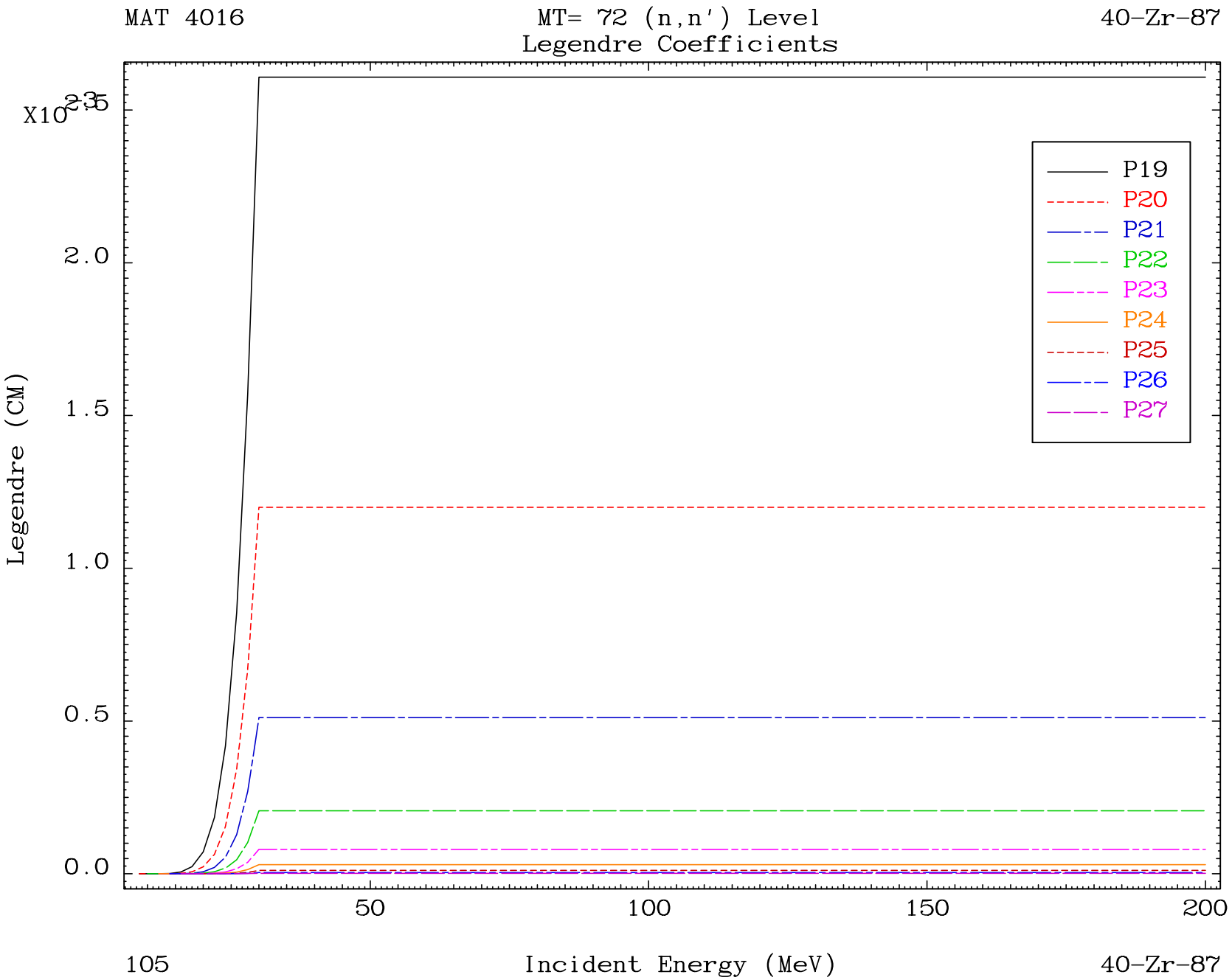

MAT 4016
MT= 71 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
Legendre (CM)
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
0
50
100
150
200
100
Incident Energy (MeV)
40-Zr-87

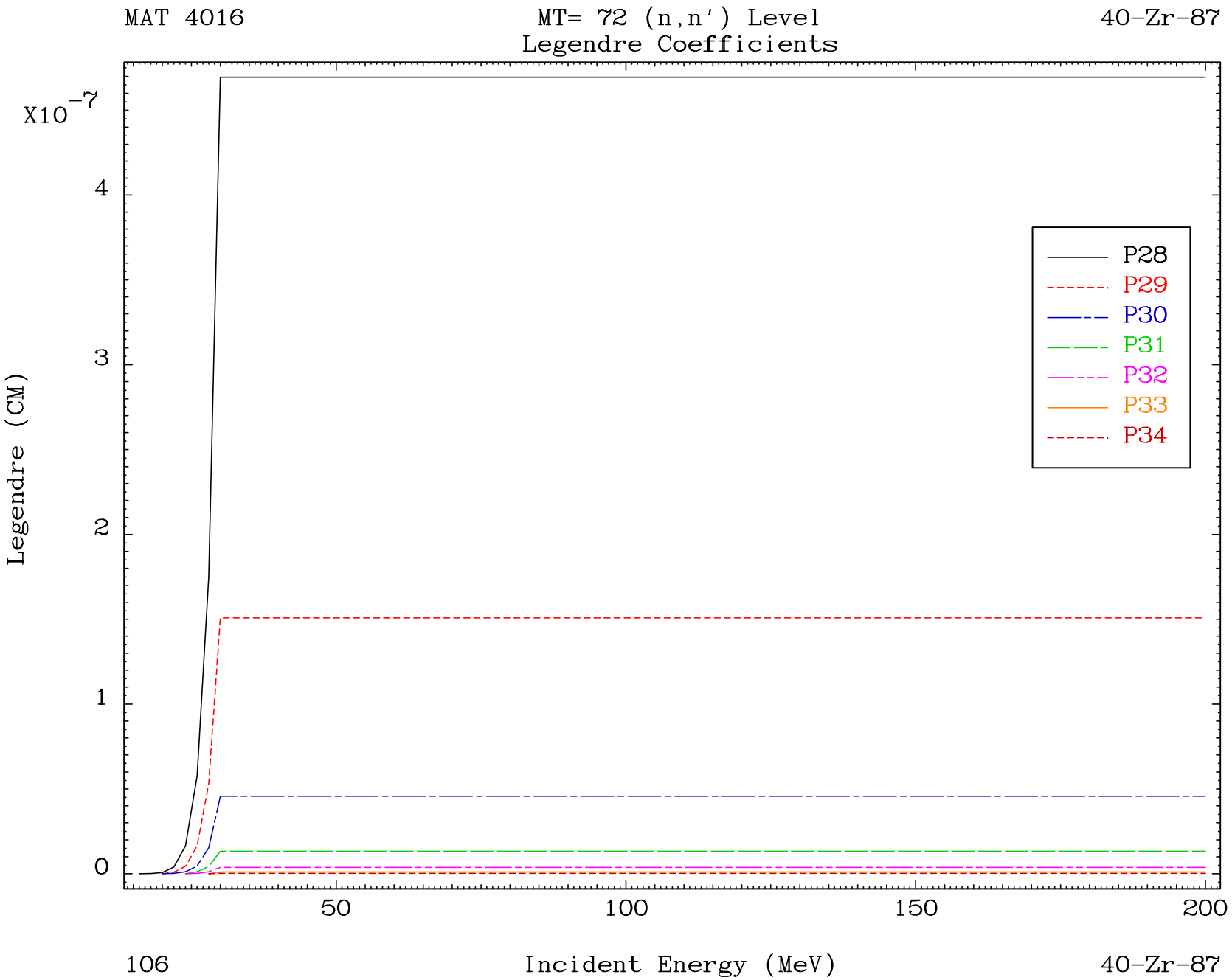

MAT 4016
MT= 71 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-4
6
4
2
0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
101
Incident Energy (MeV)
40-Zr-87

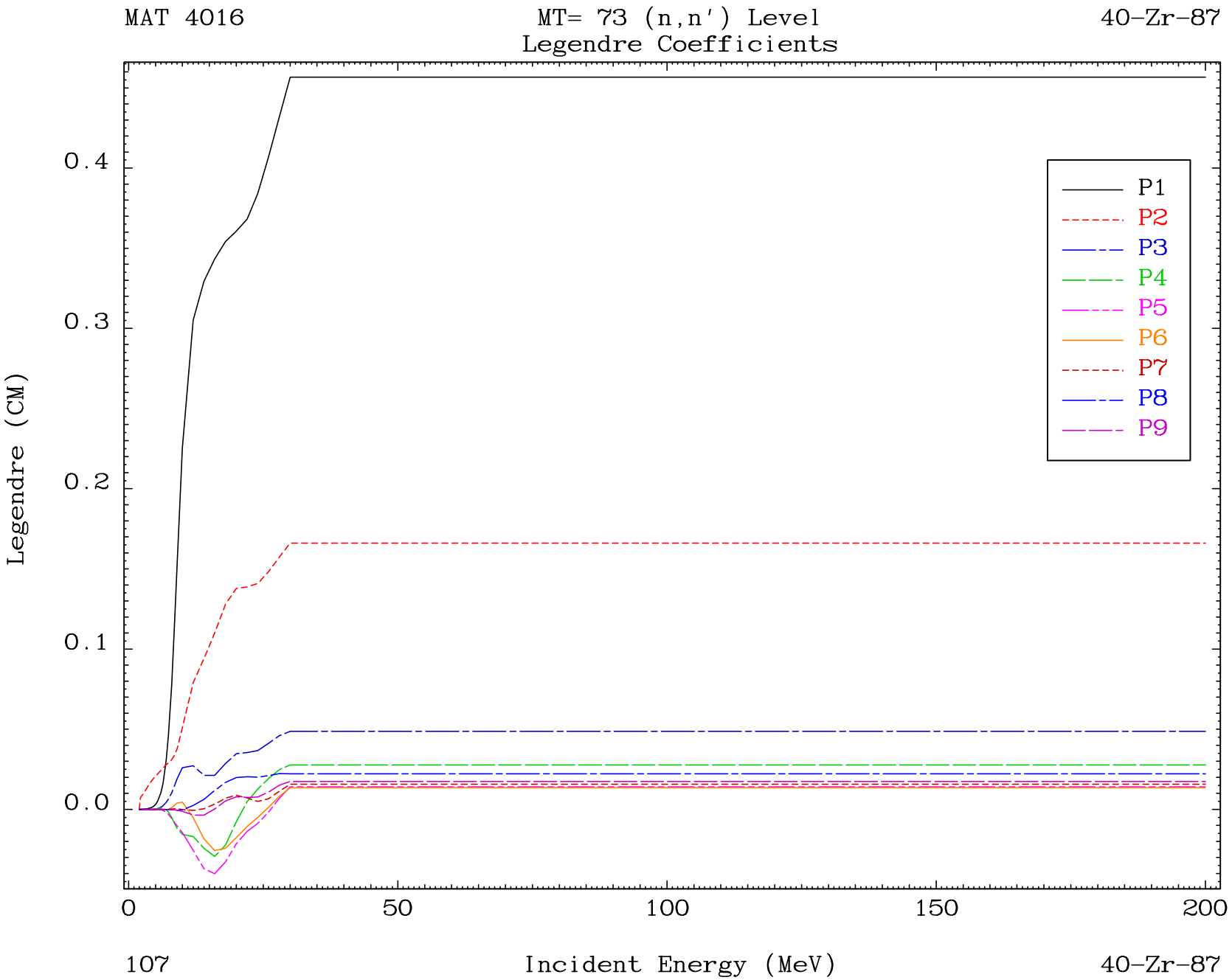

MAT 4016
MT= 71 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-7
2.5
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
50
100
150
200
102
Incident Energy (MeV)
40-Zr-87
P28
P29
P30
P31
P32
P33
P34

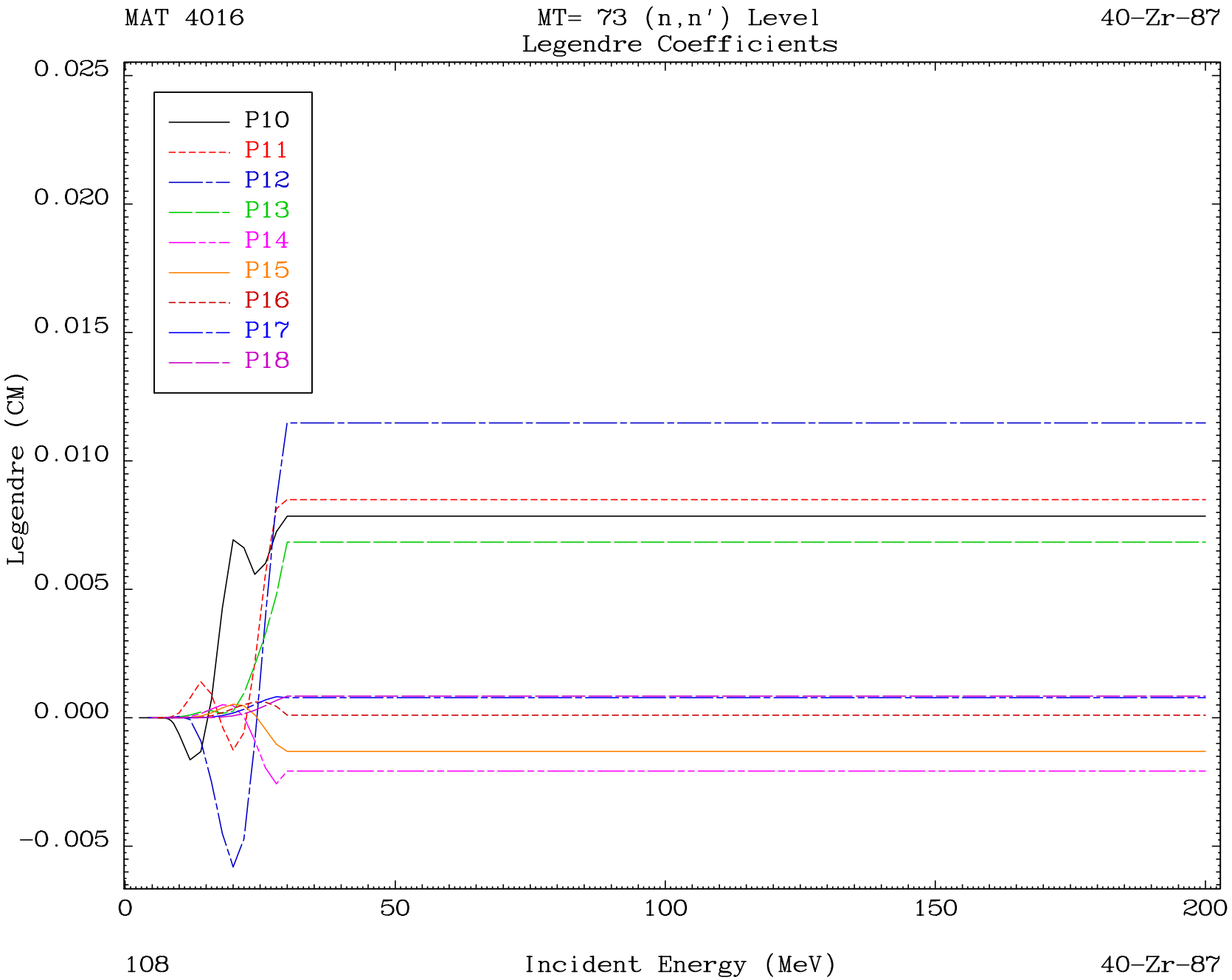

MAT 4016
MT= 72 (n,n') Level
Legendre Coefficients
40-Zr-87
0.5
0.4
0.3
0.2
0.1
0.0
Legendre (CM)
P1
P2
P3
P4
P5
P6
P7
P8
P9
0
50
100
150
200
103
Incident Energy (MeV)
40-Zr-87

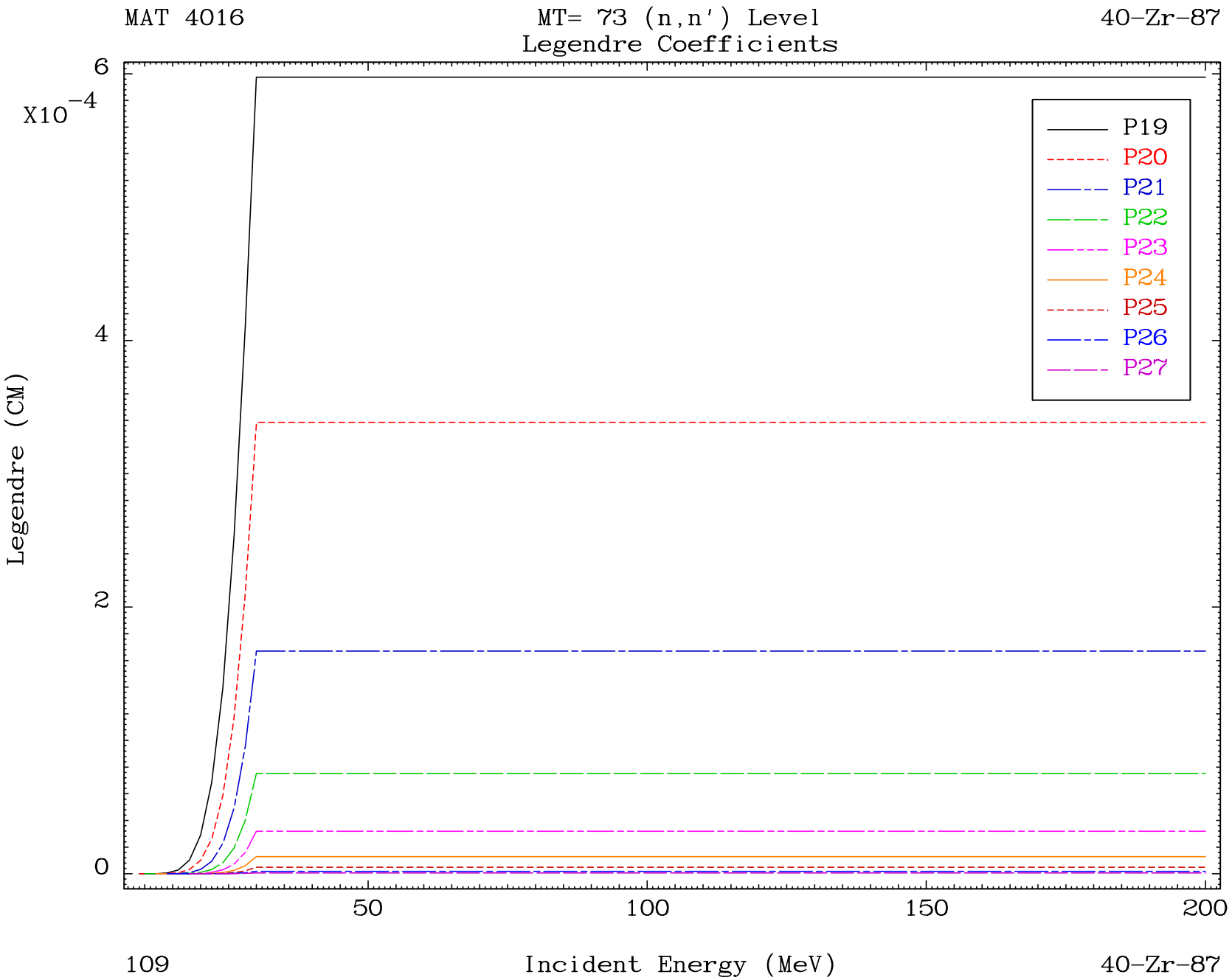

MAT 4016
MT= 72 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.04
0.02
0.00
-0.02
Legendre (CM)
0
50
100
150
200
104
Incident Energy (MeV)
40-Zr-87

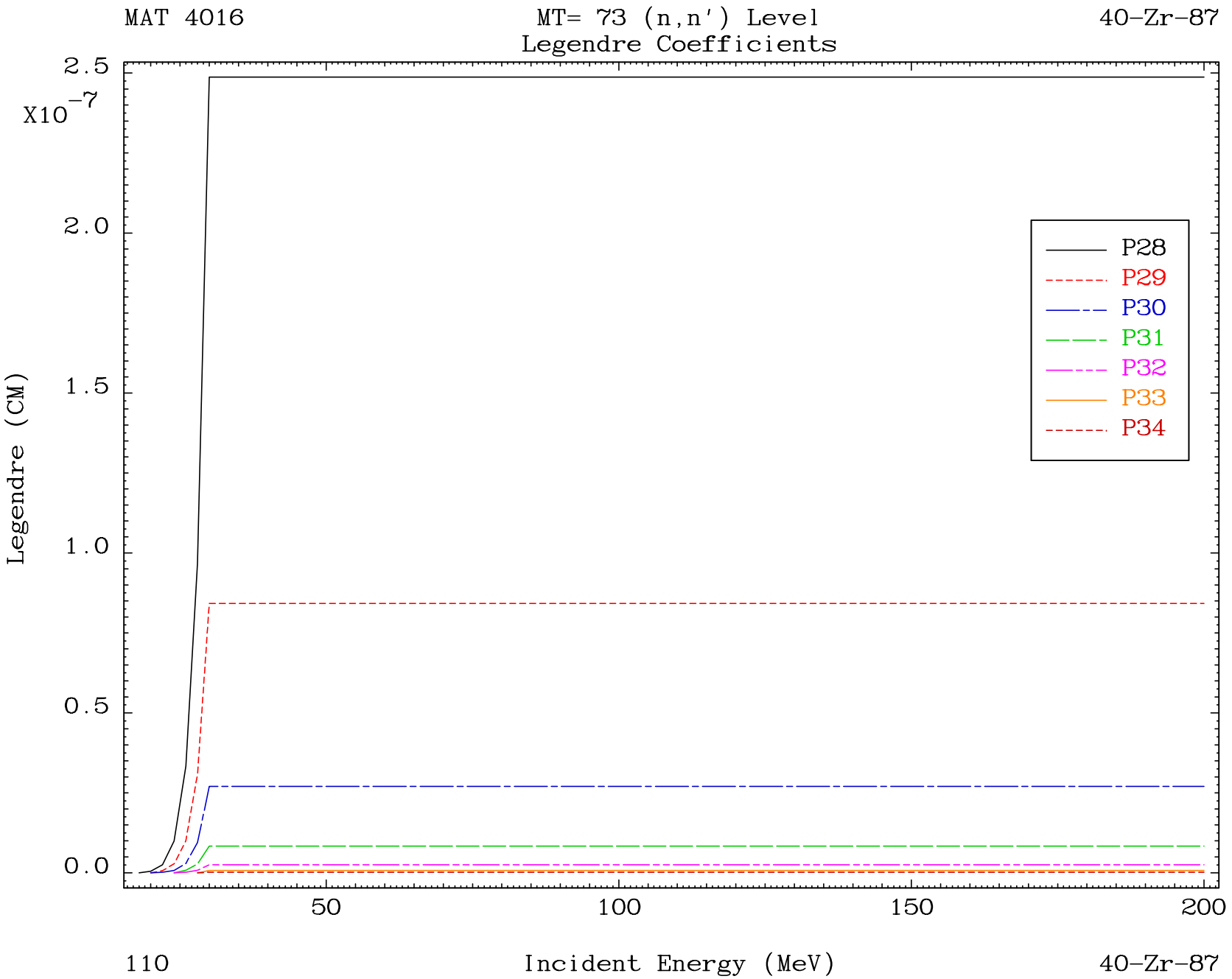

MAT 4016
MT= 72 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-2
2.5
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
105
Incident Energy (MeV)
40-Zr-87

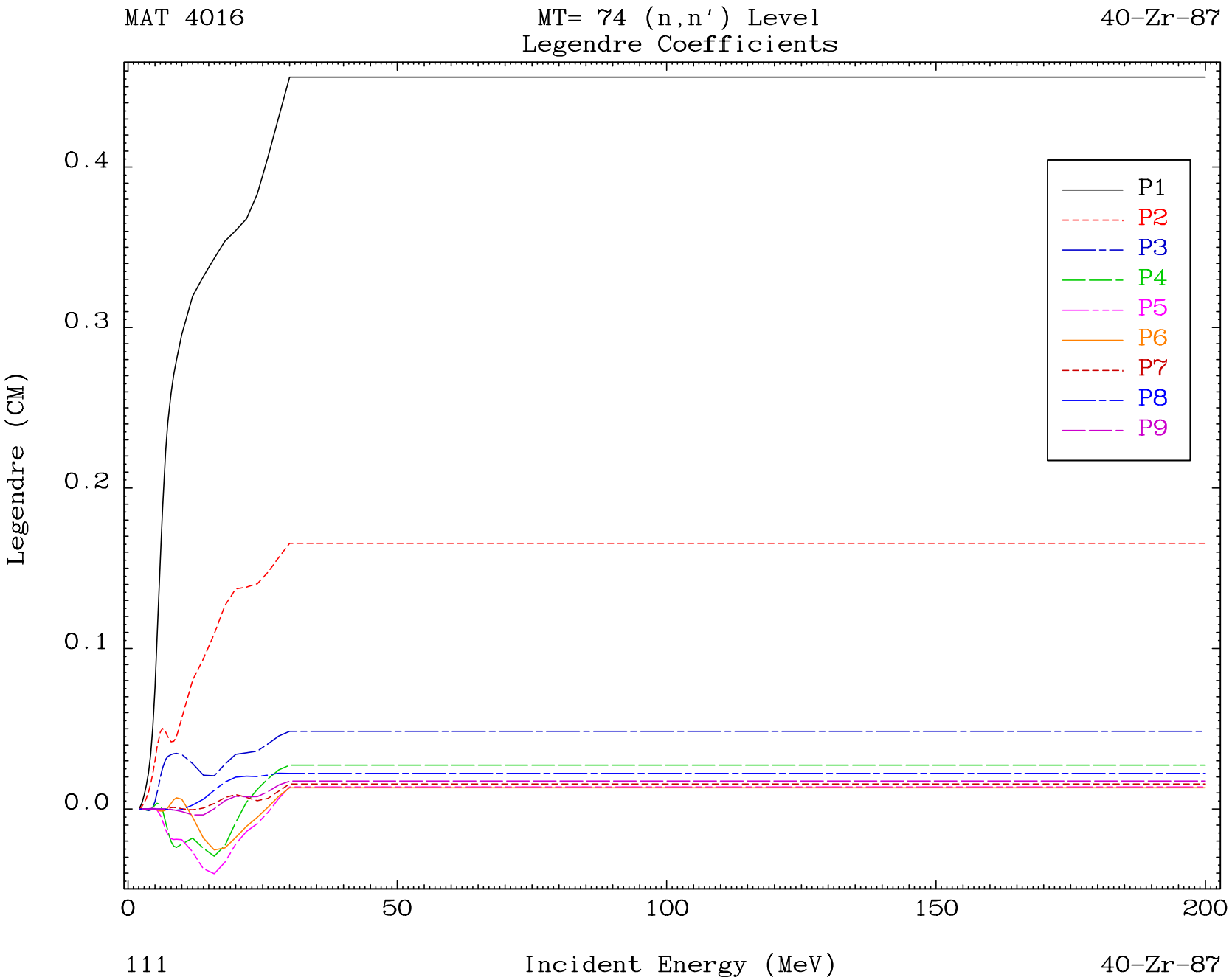

MAT 4016
MT= 72 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-7
4
3
2
1
0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
106
Incident Energy (MeV)
40-Zr-87

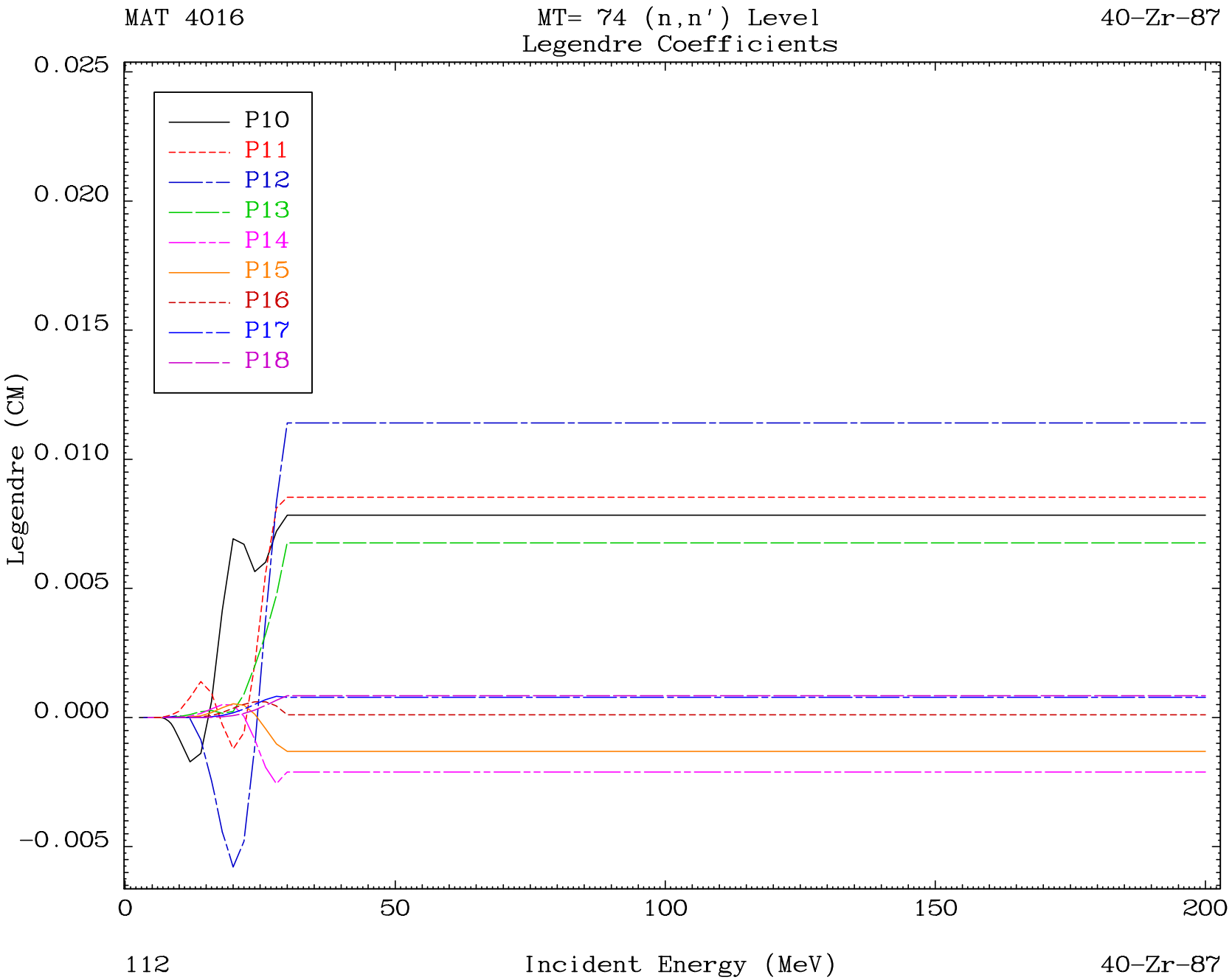

MAT 4016
MT= 73 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
P1
P2
P3
P4
P5
P6
P7
P8
P9
0
50
100
150
200
107
Incident Energy (MeV)
40-Zr-87

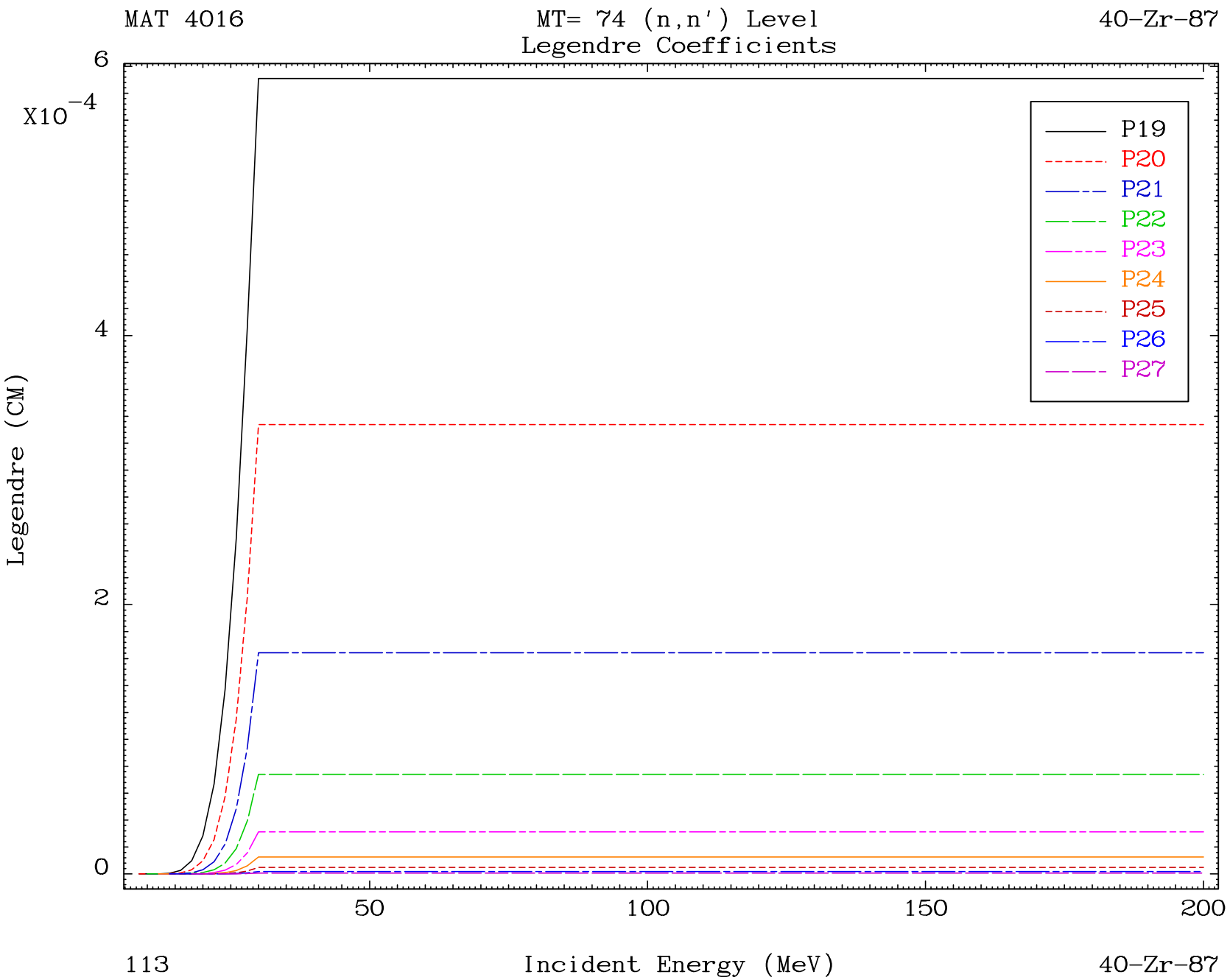

MAT 4016
MT= 73 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
Legendre (CM)
0
50
100
150
200
108
Incident Energy (MeV)
40-Zr-87

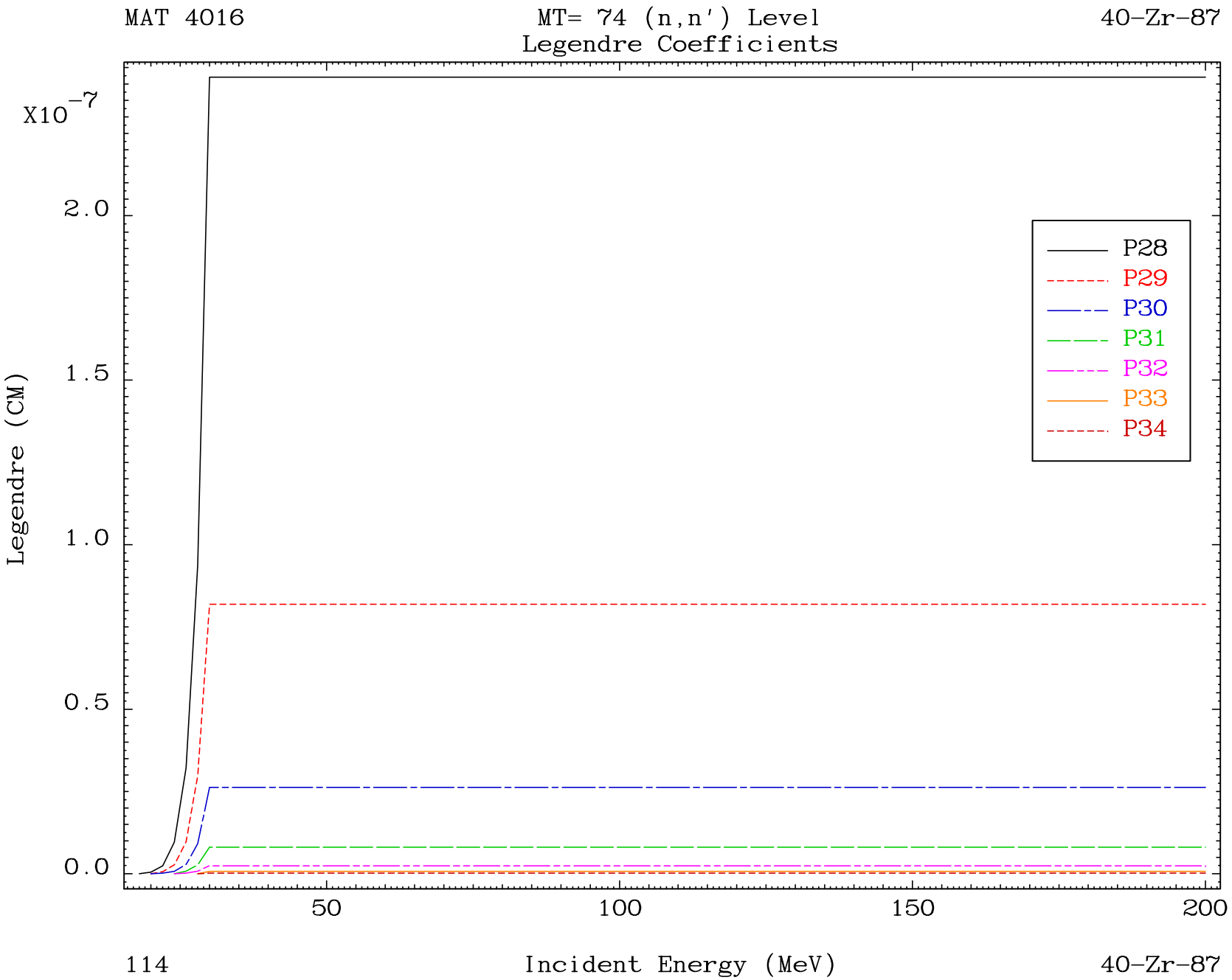

MAT 4016
MT= 73 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-4
6
4
2
0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
109
Incident Energy (MeV)
40-Zr-87

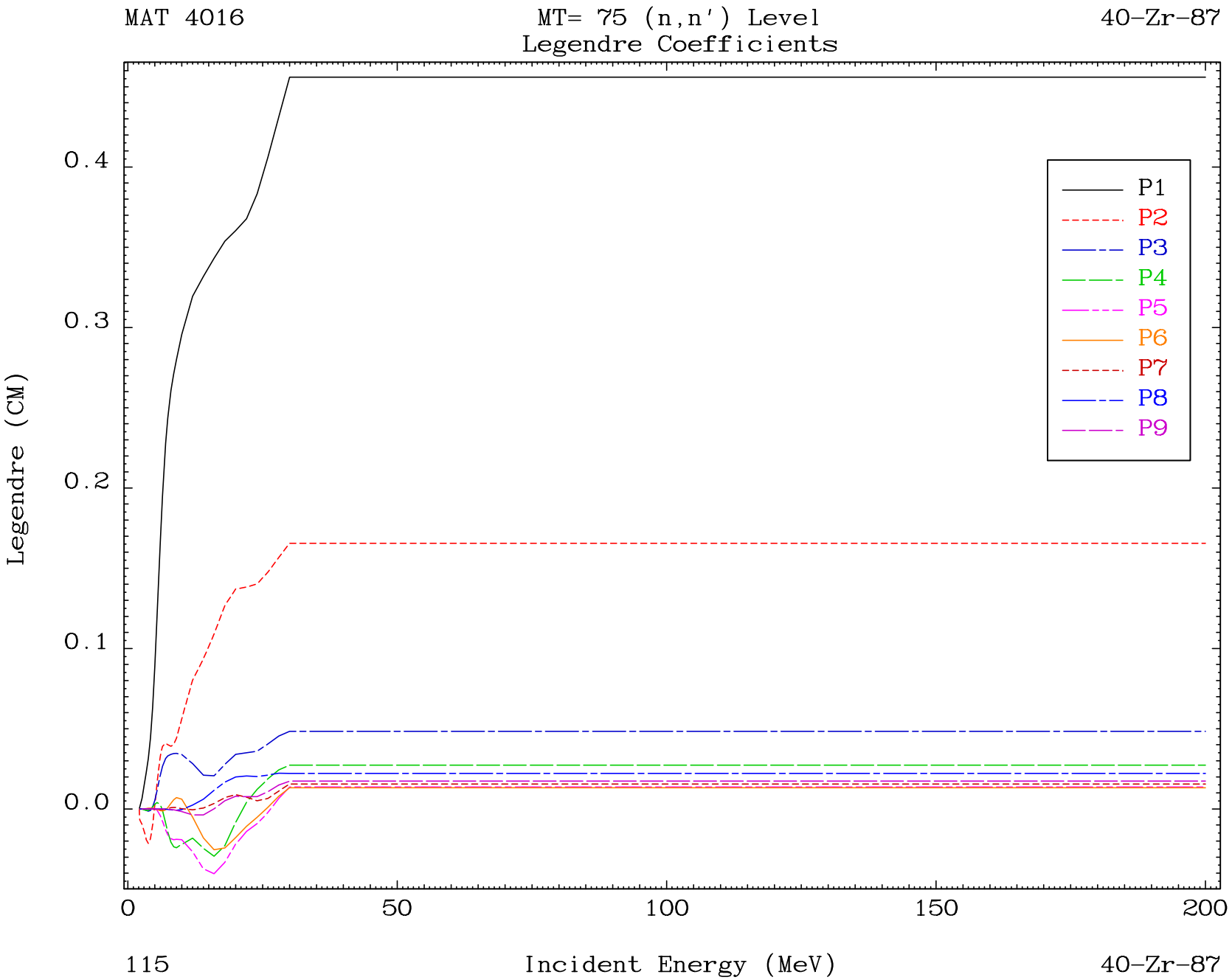

MAT 4016
MT= 73 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-7
2.5
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
110
Incident Energy (MeV)
40-Zr-87

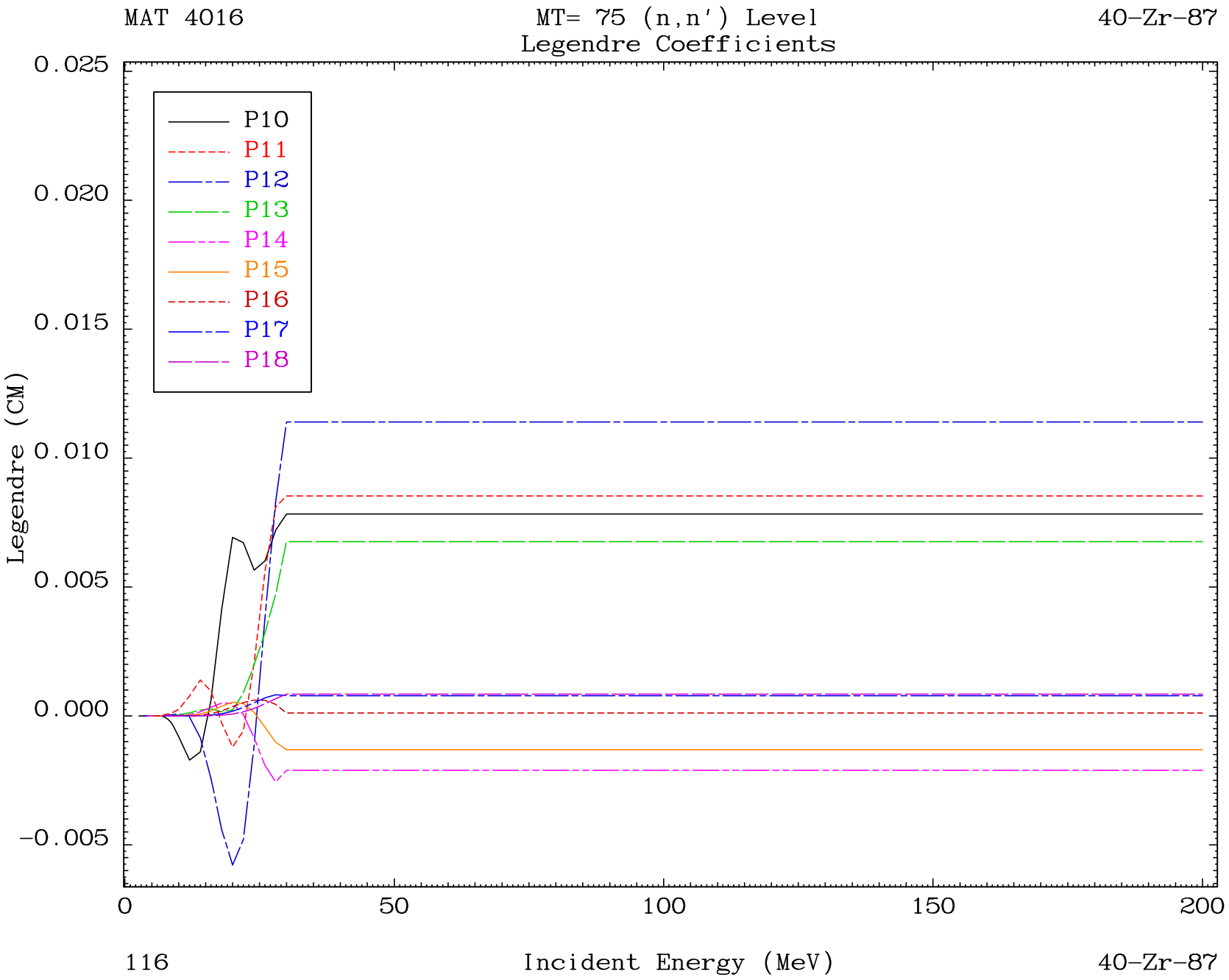

MAT 4016
MT= 74 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
P1
P2
P3
P4
P5
P6
P7
P8
P9
111
Incident Energy (MeV)
40-Zr-87

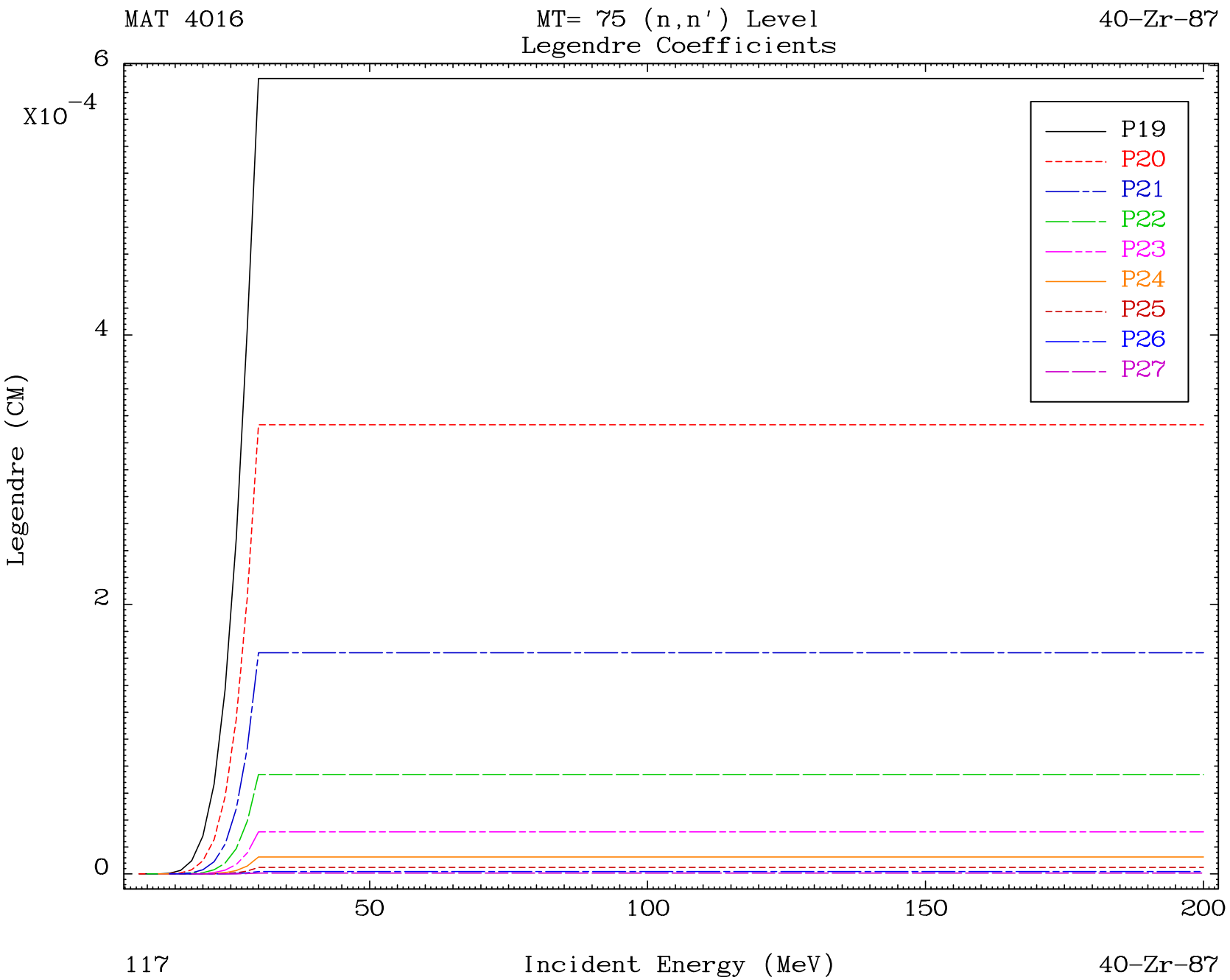

MAT 4016
MT= 74 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
Legendre (CM)
0
50
100
150
200
112
Incident Energy (MeV)
40-Zr-87

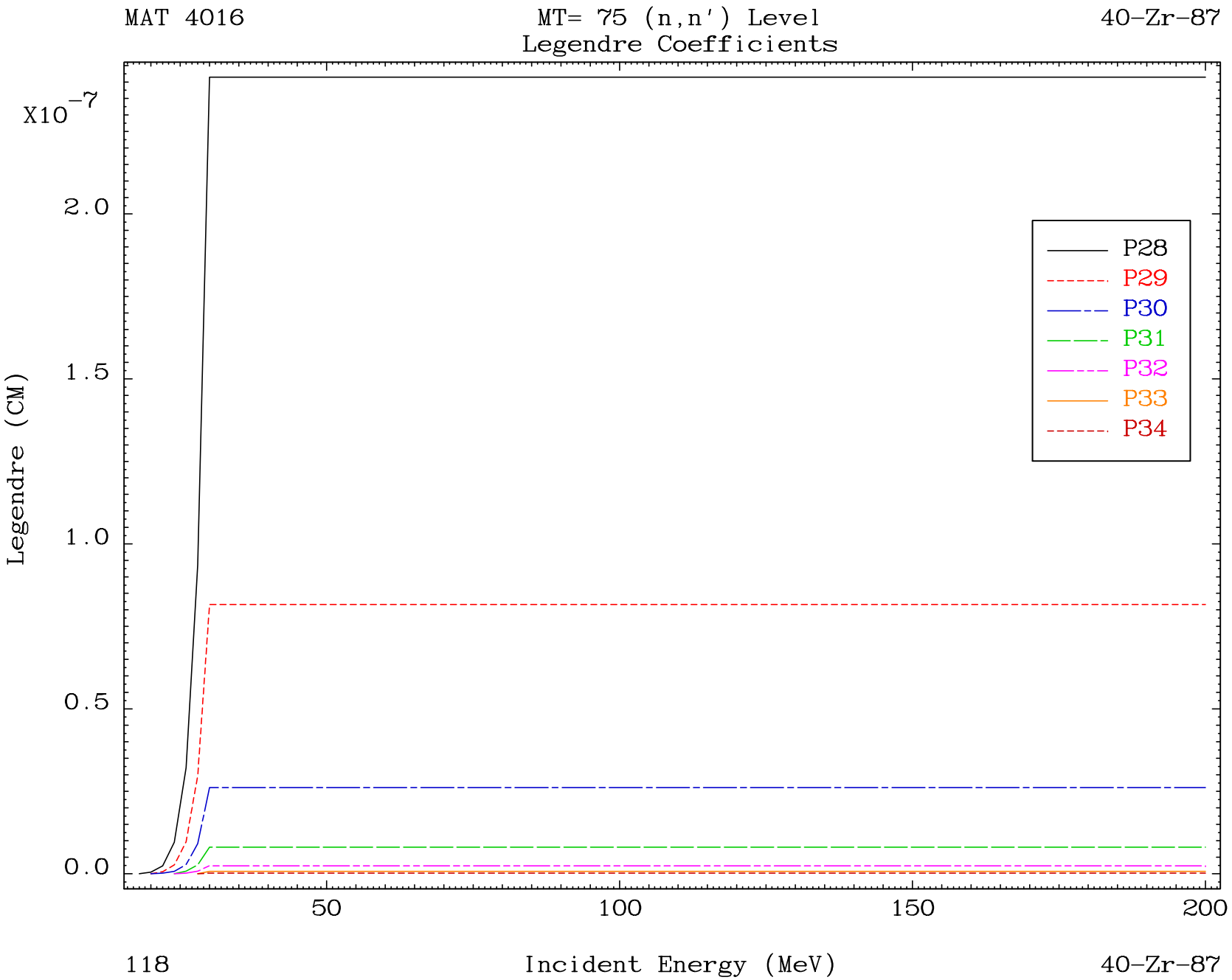

MAT 4016
MT= 74 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-4
6
4
2
0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
113
Incident Energy (MeV)
40-Zr-87

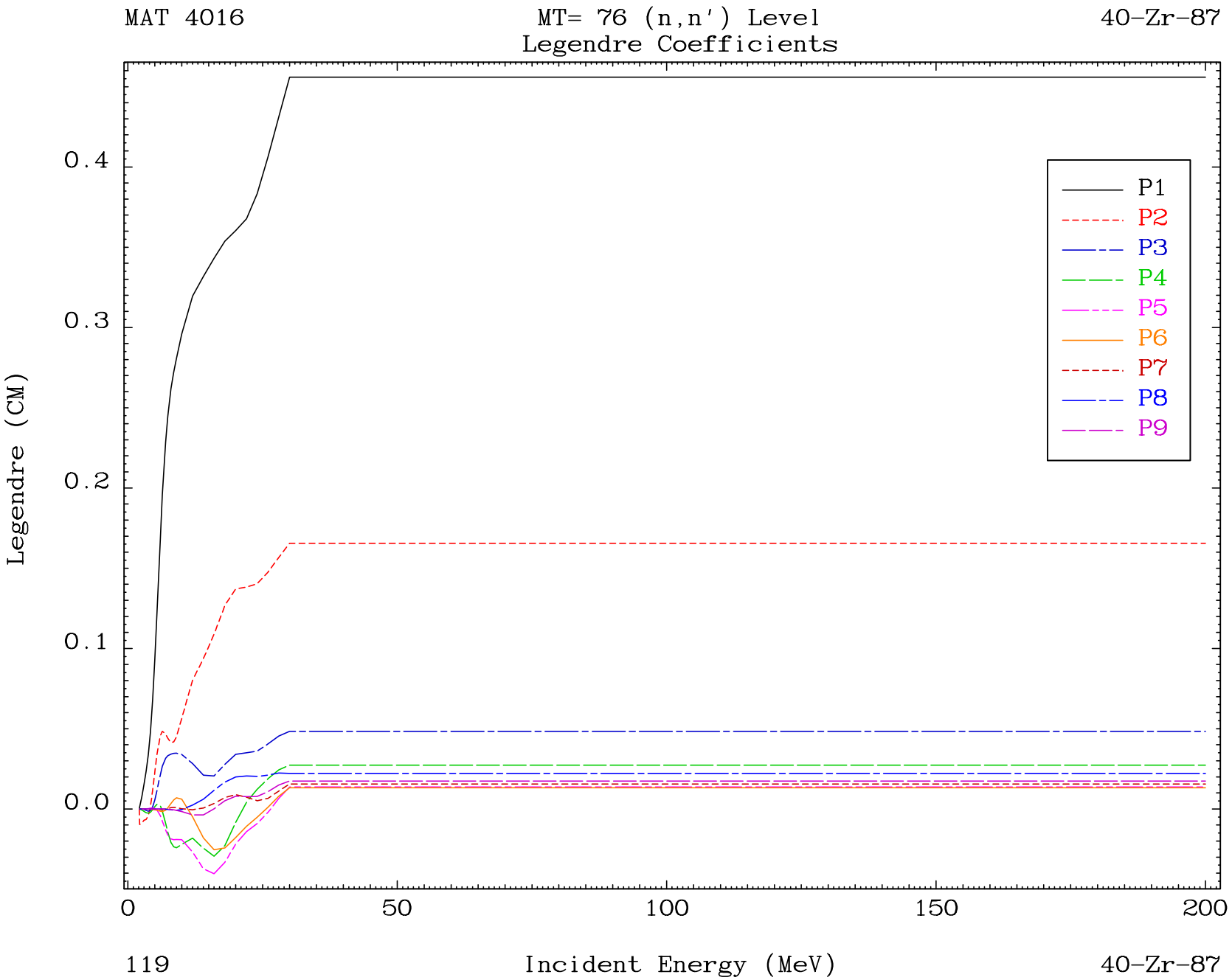

MAT 4016
MT= 74 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-7
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
114
Incident Energy (MeV)
40-Zr-87

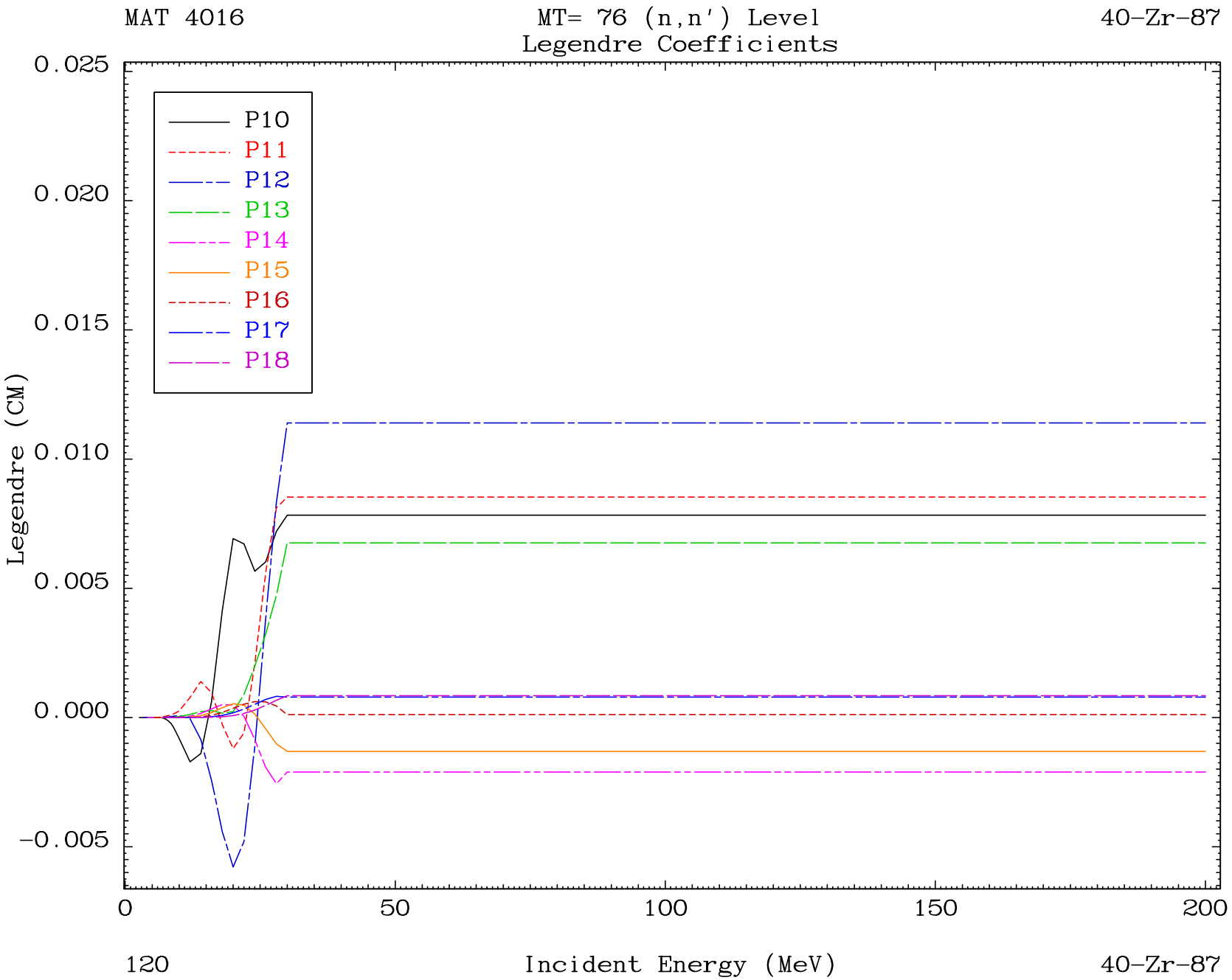

MAT 4016
MT= 75 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
P1
P2
P3
P4
P5
P6
P7
P8
P9
115
Incident Energy (MeV)
40-Zr-87

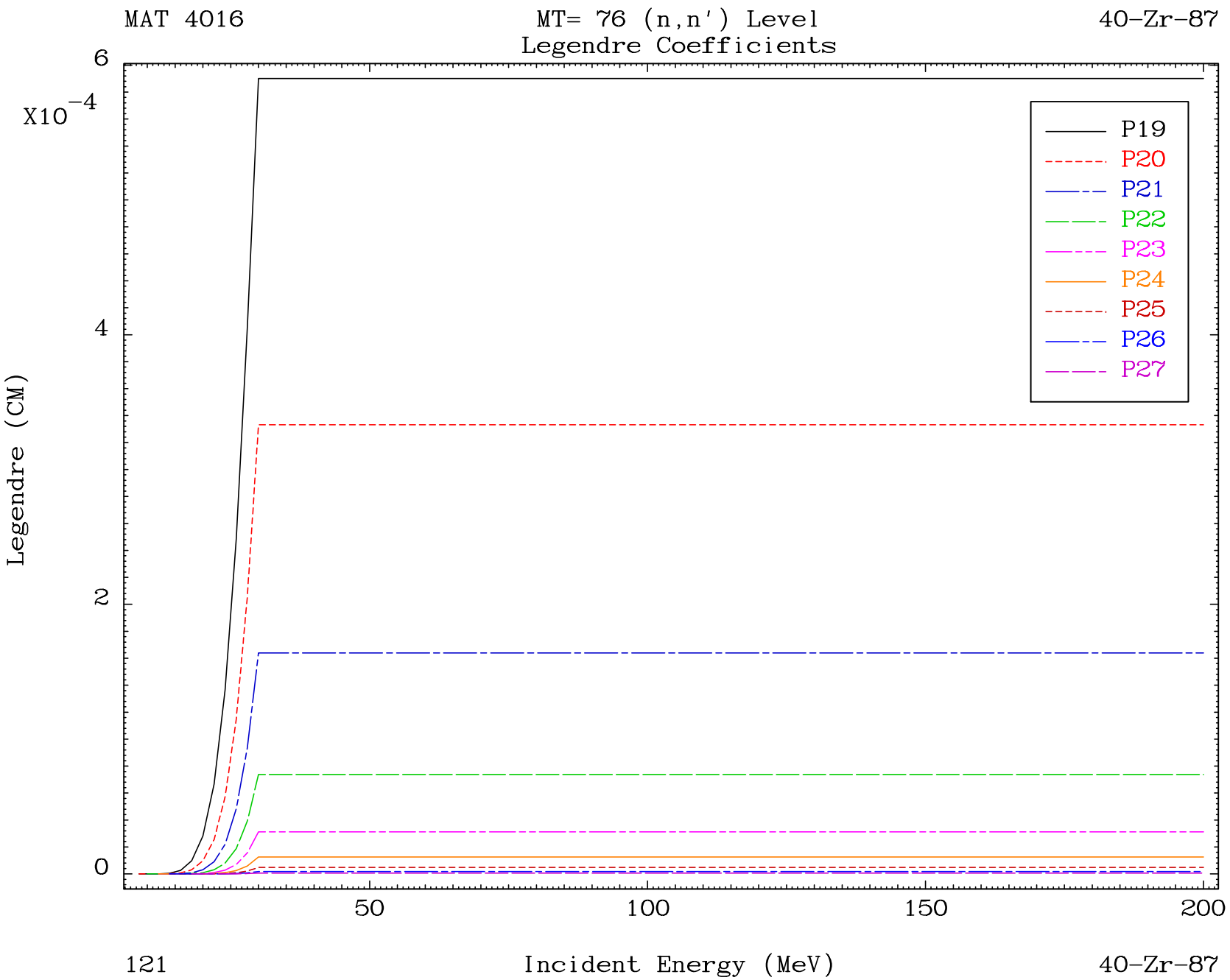

MAT 4016
MT= 75 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
Legendre (CM)
0
50
100
150
200
116
Incident Energy (MeV)
40-Zr-87

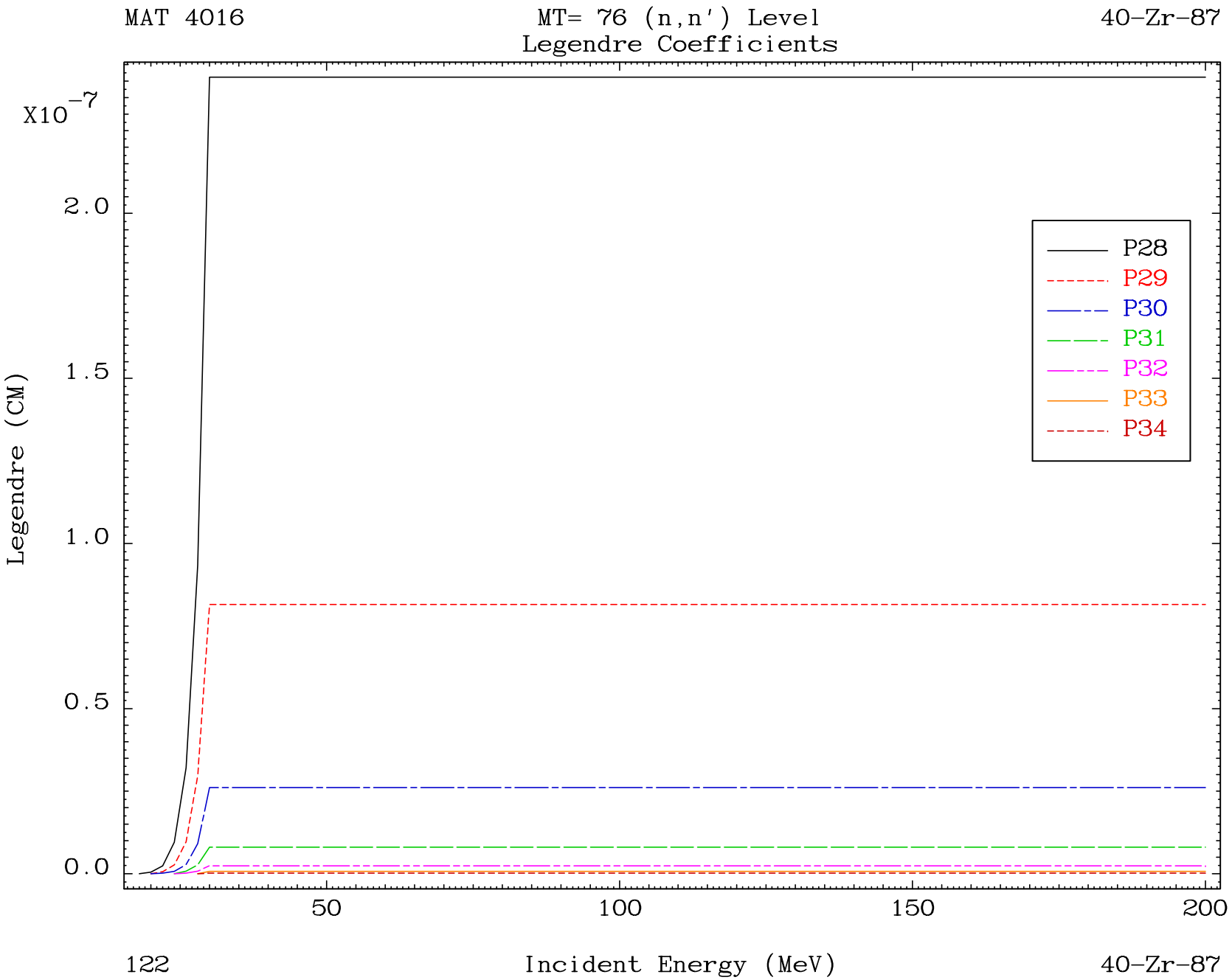

MAT 4016
MT= 75 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-4
6
4
2
0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
117
Incident Energy (MeV)
40-Zr-87

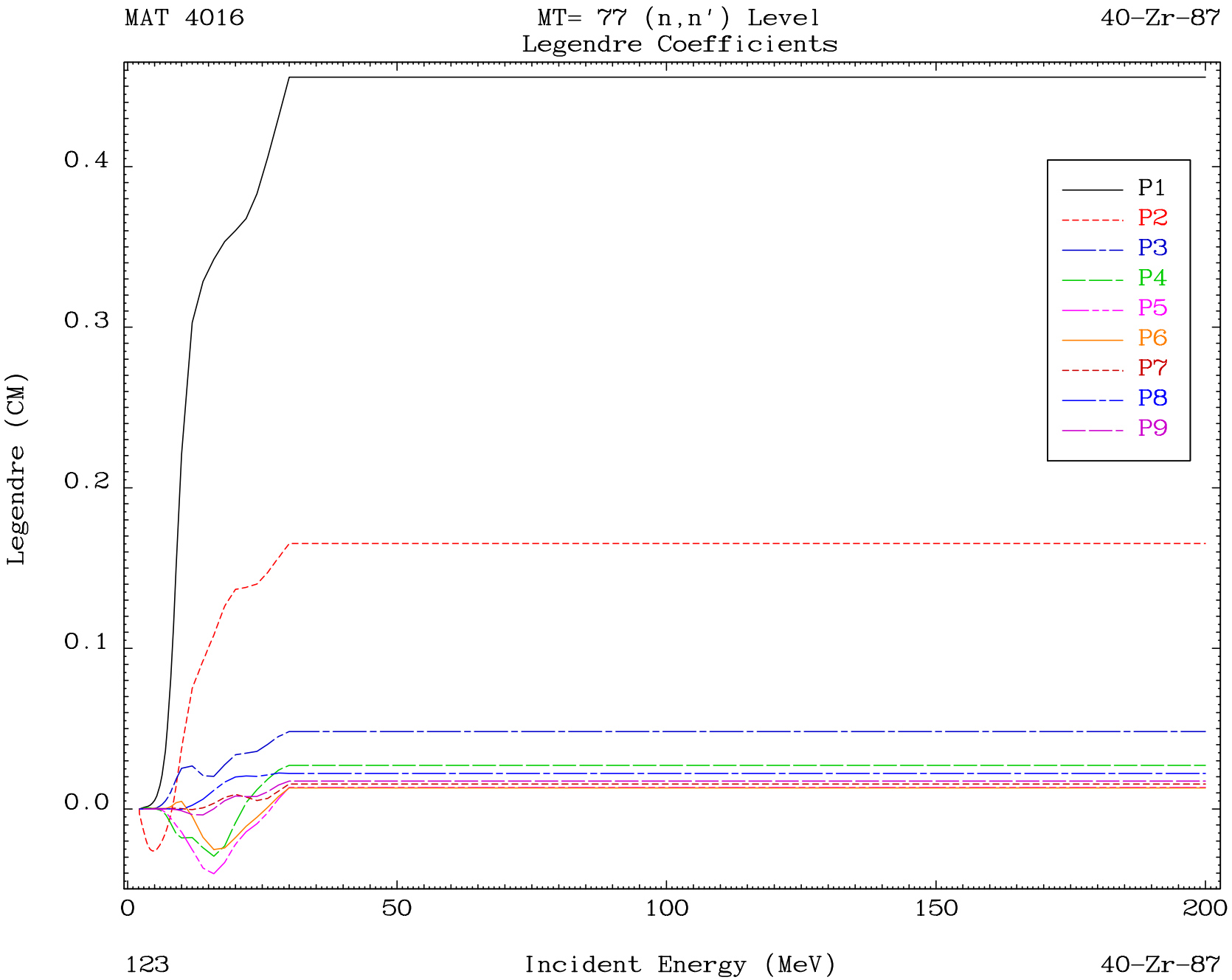

MAT 4016
MT= 75 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-7
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
118
Incident Energy (MeV)
40-Zr-87

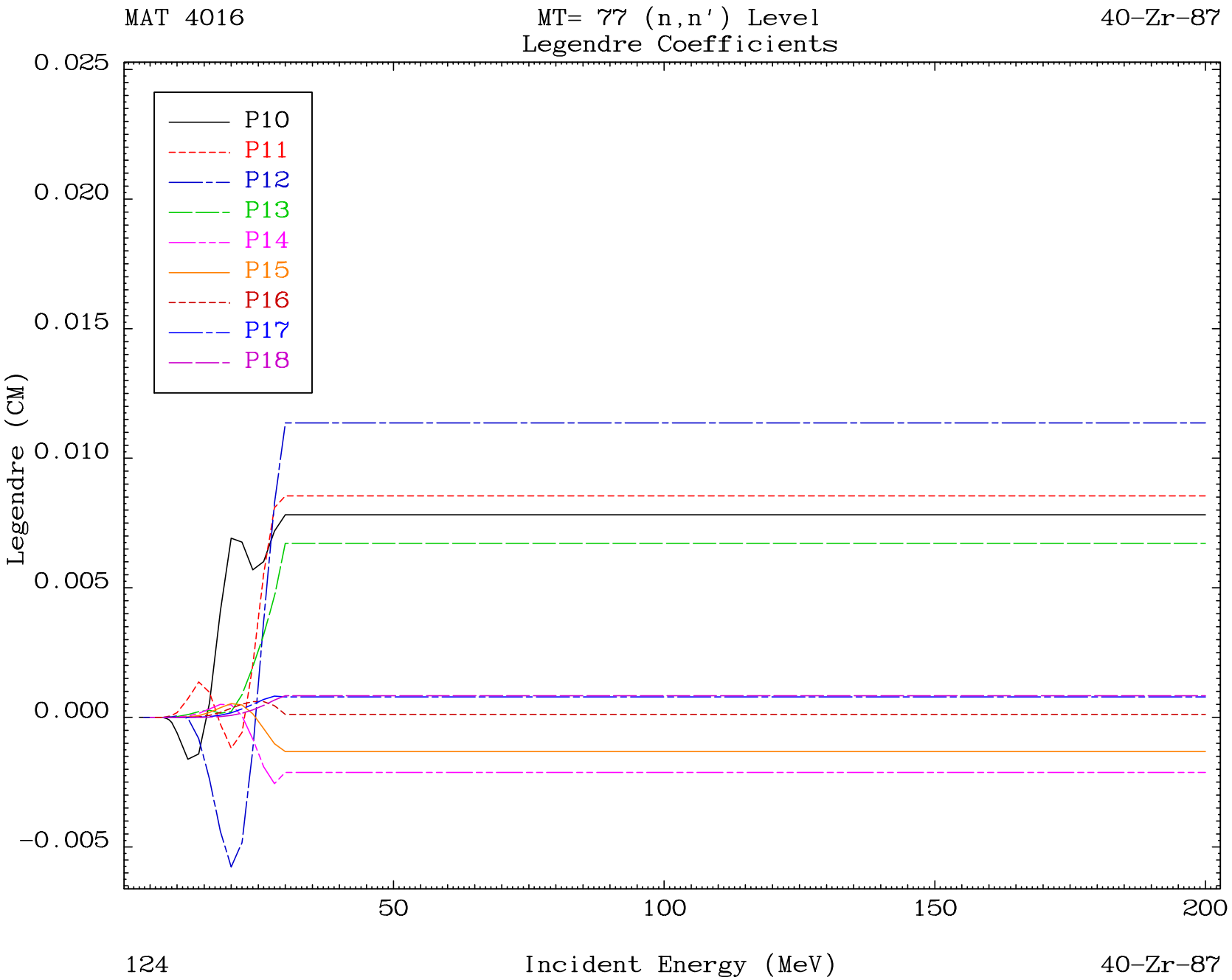

MAT 4016
MT= 76 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
P1
P2
P3
P4
P5
P6
P7
P8
P9
119
Incident Energy (MeV)
40-Zr-87

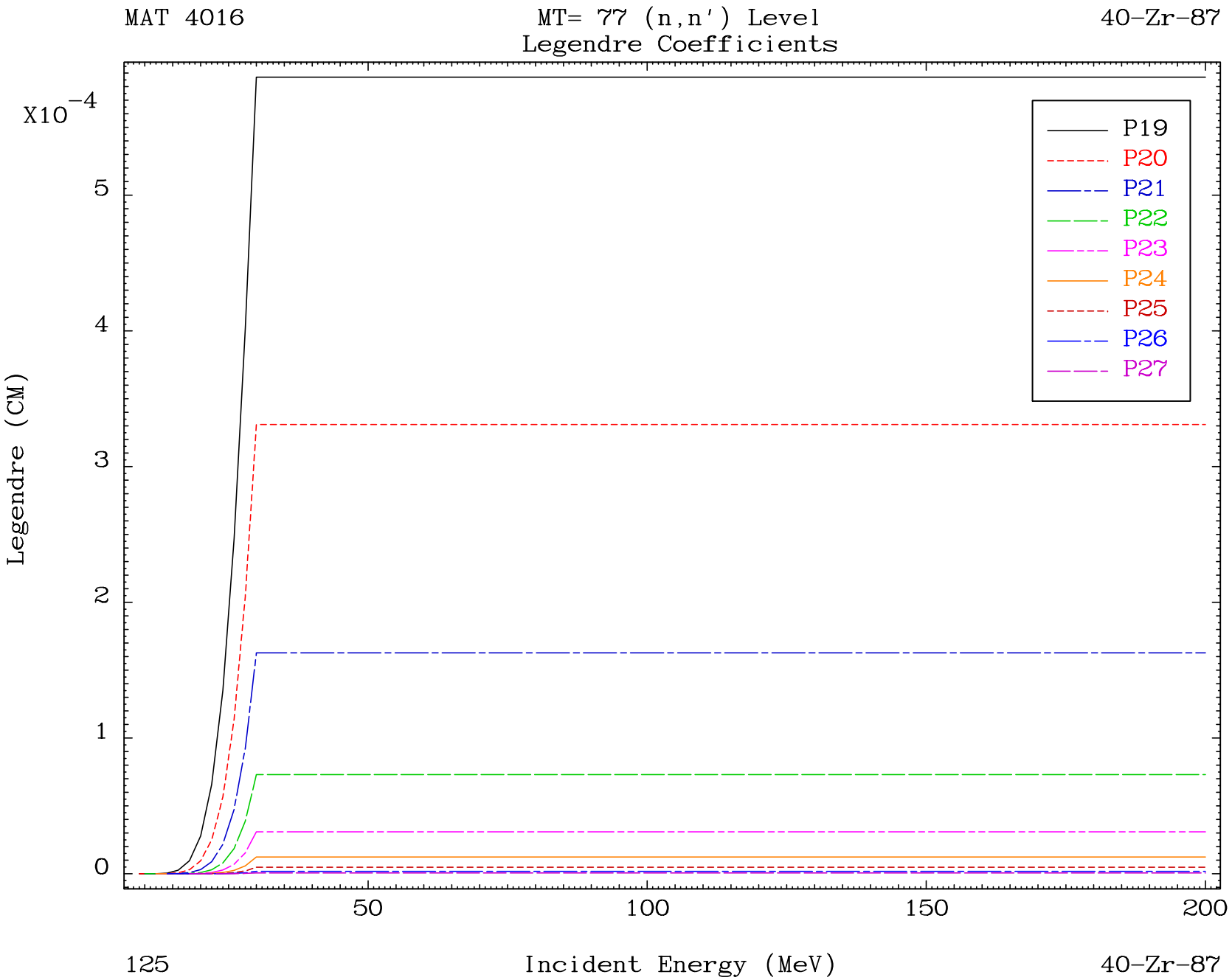

MAT 4016
MT= 76 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
Legendre (CM)
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
0
50
100
150
200
120
Incident Energy (MeV)
40-Zr-87

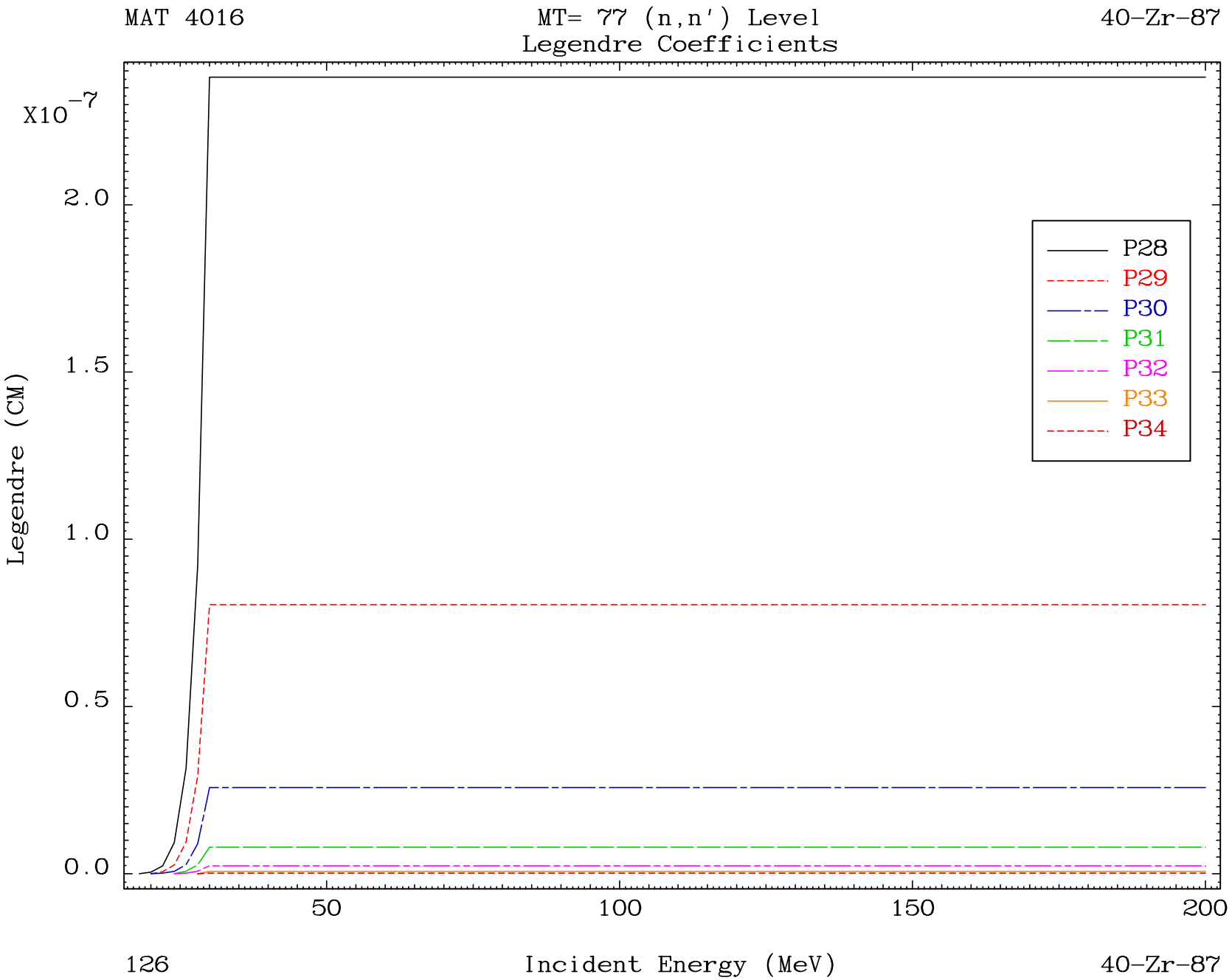

MAT 4016
MT= 76 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-4
6
4
2
0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
121
Incident Energy (MeV)
40-Zr-87

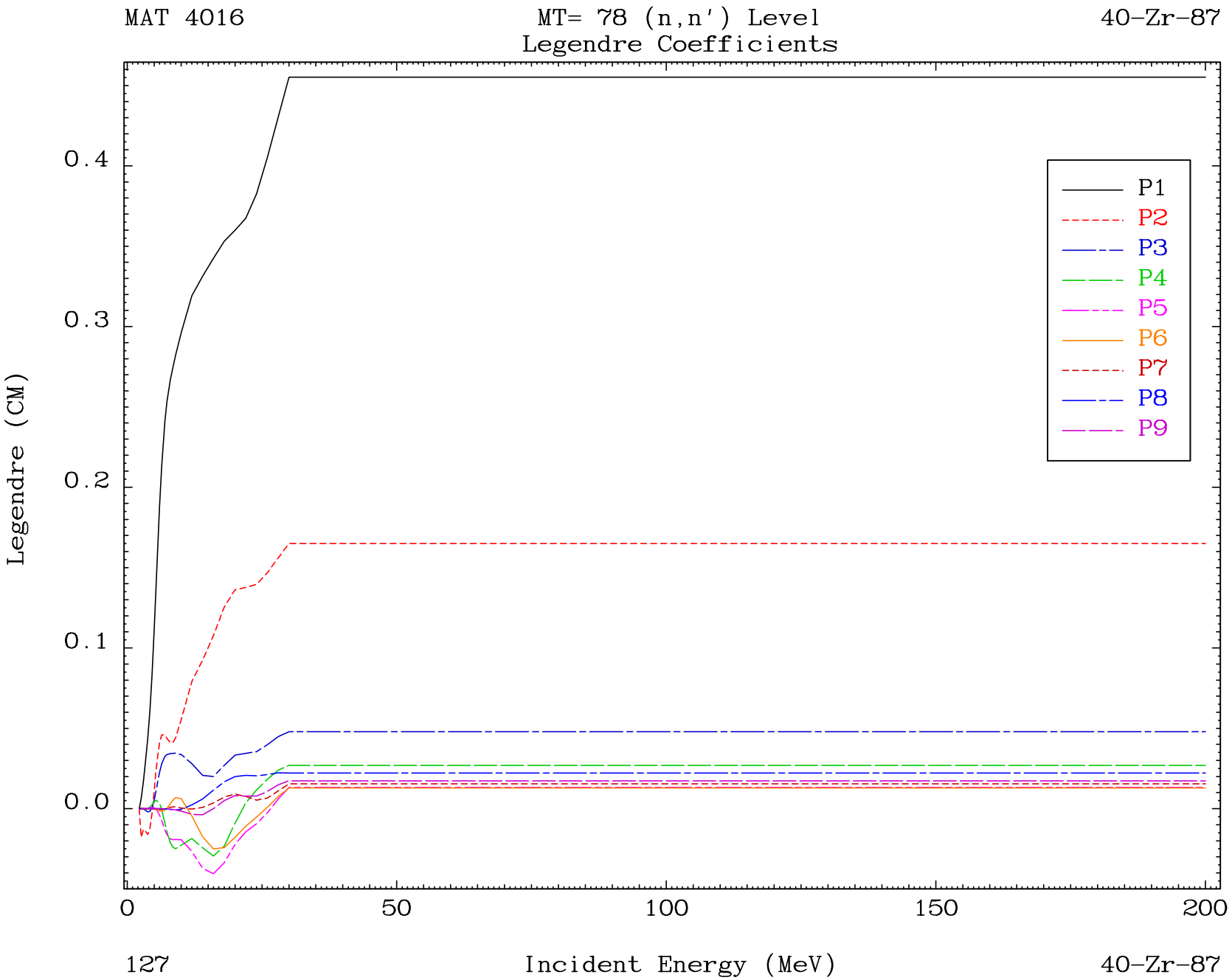

MAT 4016
MT= 76 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-7
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
122
Incident Energy (MeV)
40-Zr-87

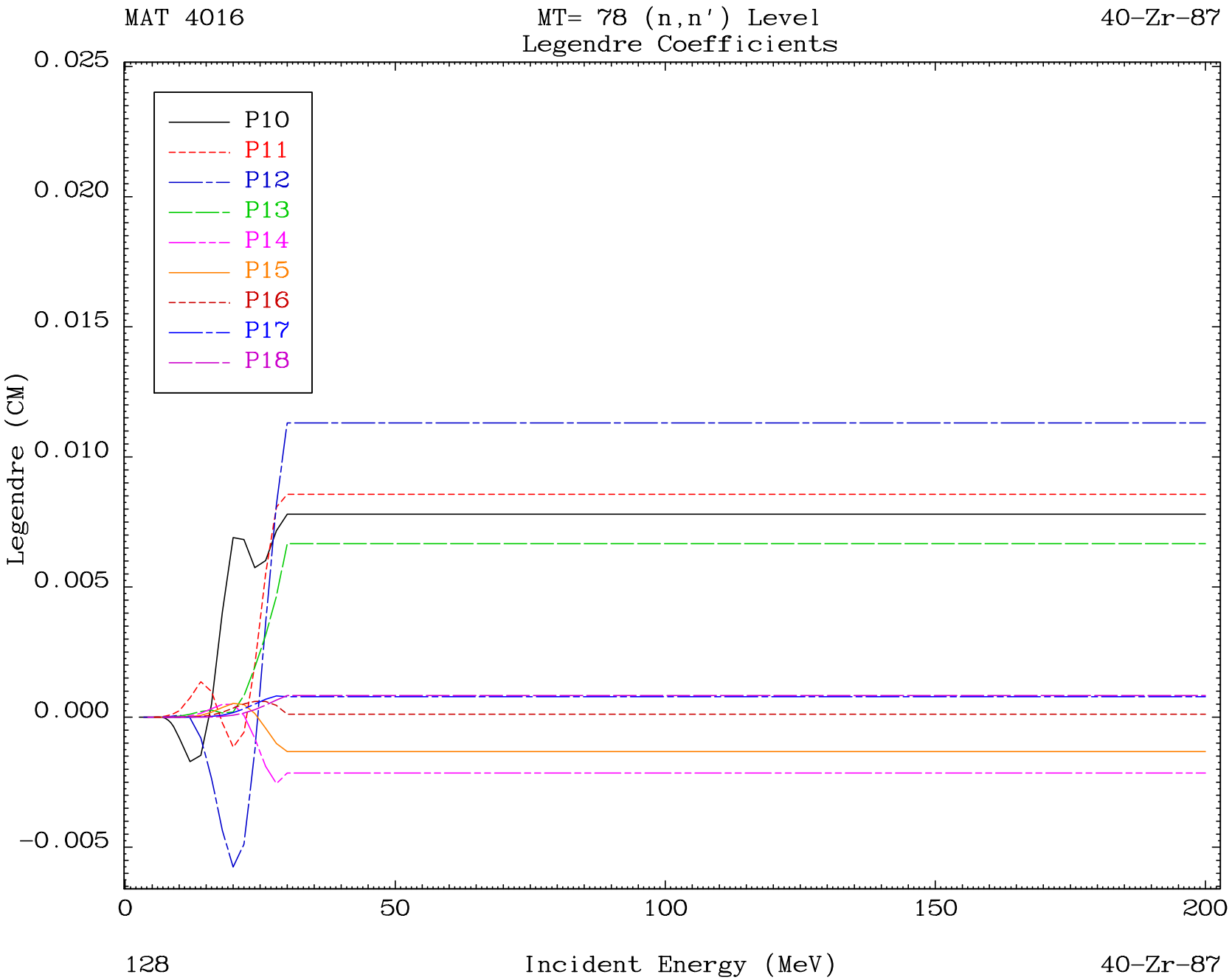

MAT 4016
MT= 77 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
P1
P2
P3
P4
P5
P6
P7
P8
P9
123
Incident Energy (MeV)
40-Zr-87

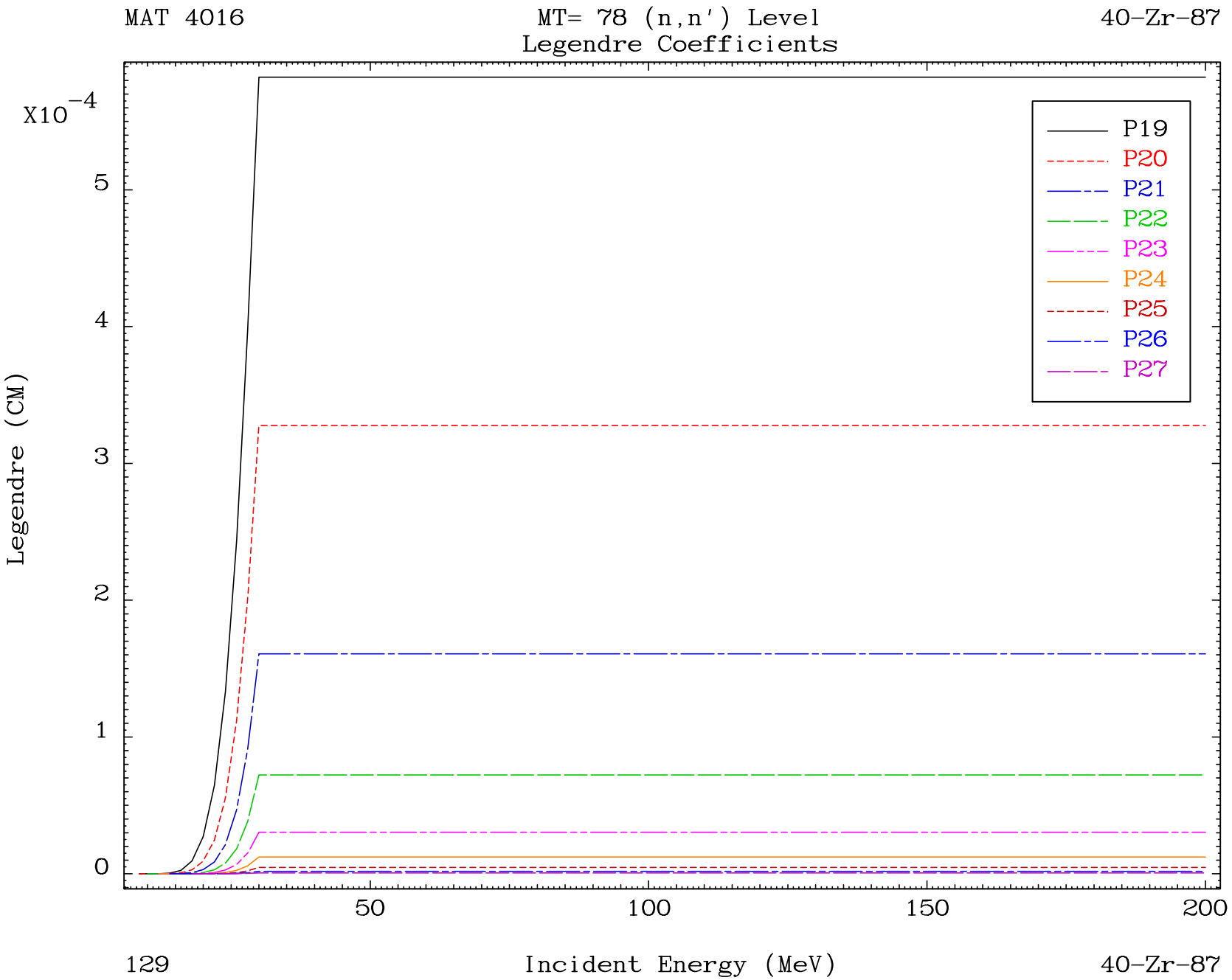

MAT 4016
MT= 77 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
Legendre (CM)
50
100
150
200
124
Incident Energy (MeV)
40-Zr-87

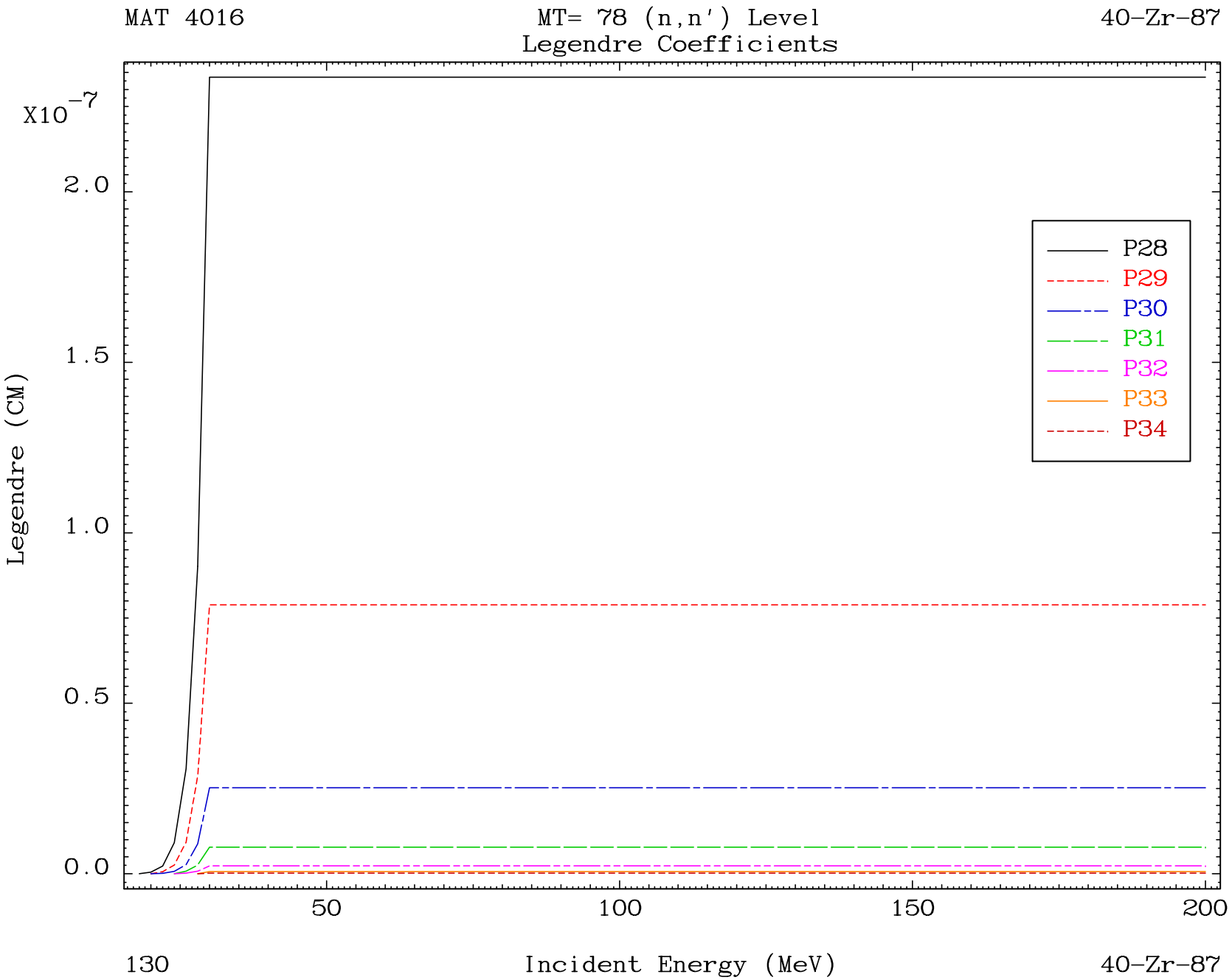

MAT 4016
MT= 77 (n,n') Level
Legendre Coefficients
40-Zr-87
X10^-4
5
4
3
2
1
0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
125
Incident Energy (MeV)
40-Zr-87

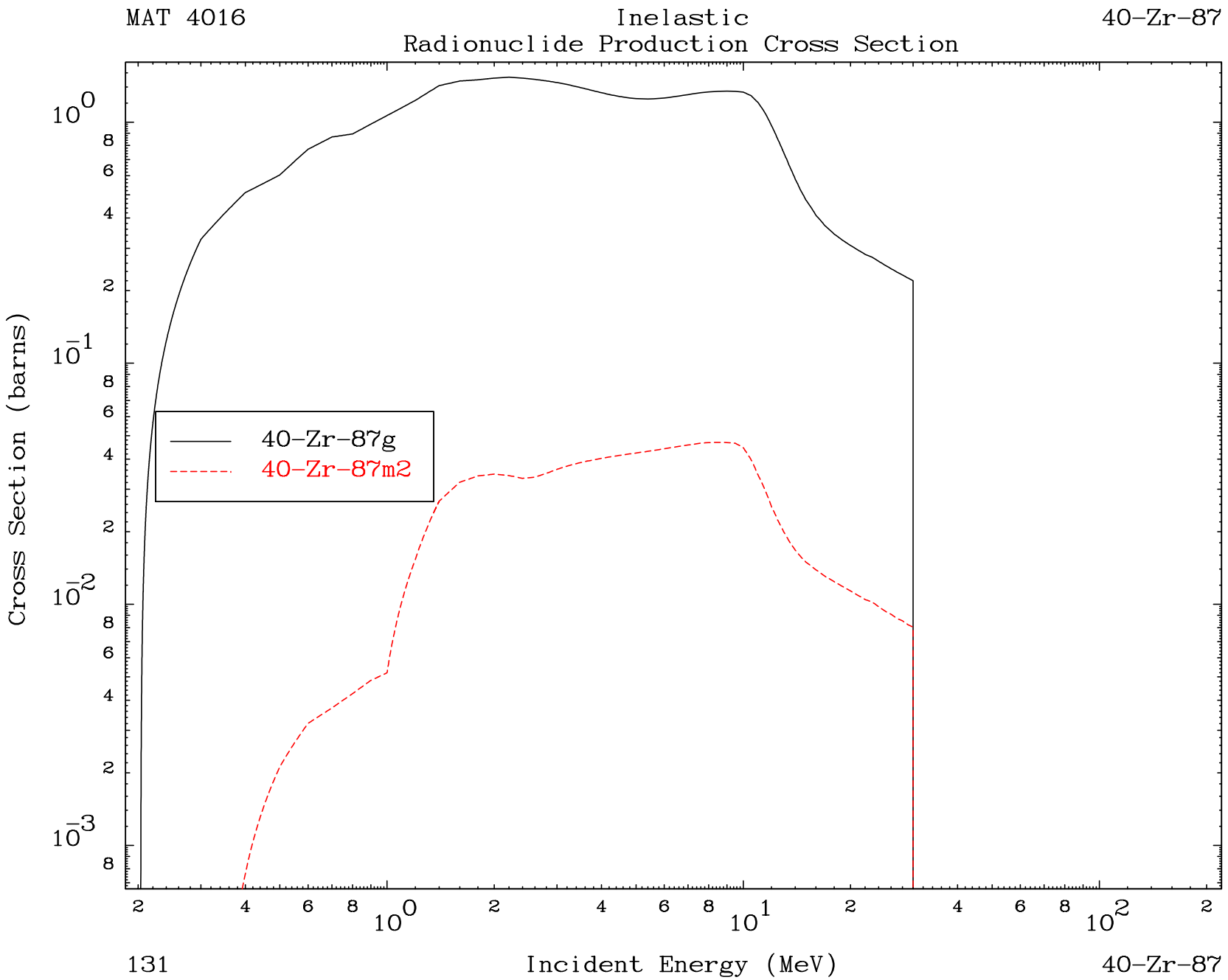

MAT 4016
MT= 77 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-7
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
126
Incident Energy (MeV)
40-Zr-87

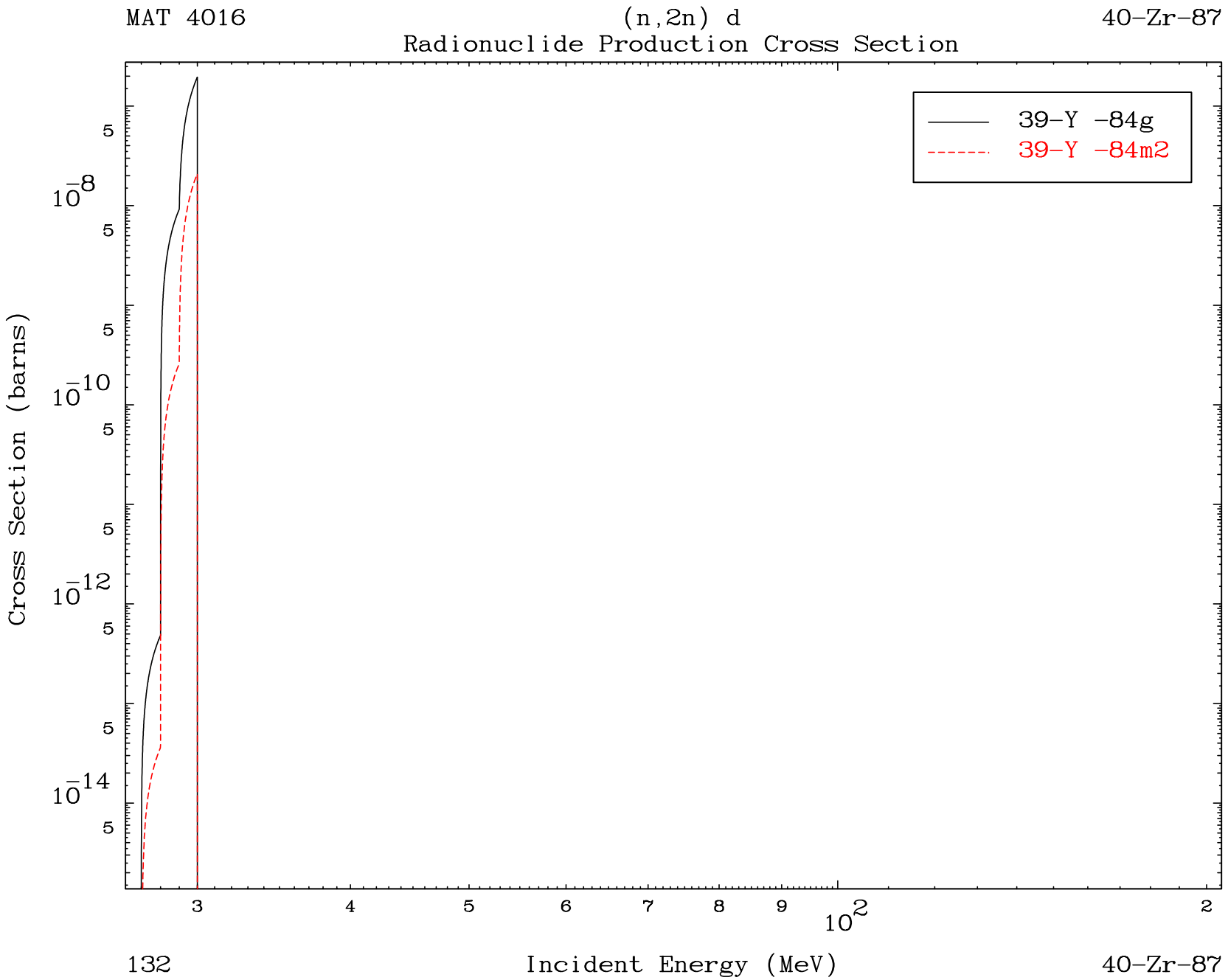

MAT 4016
MT= 78 (n,n') Level
Legendre Coefficients
40-Zr-87
Legendre (CM)
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
127
Incident Energy (MeV)
40-Zr-87
P1
P2
P3
P4
P5
P6
P7
P8
P9

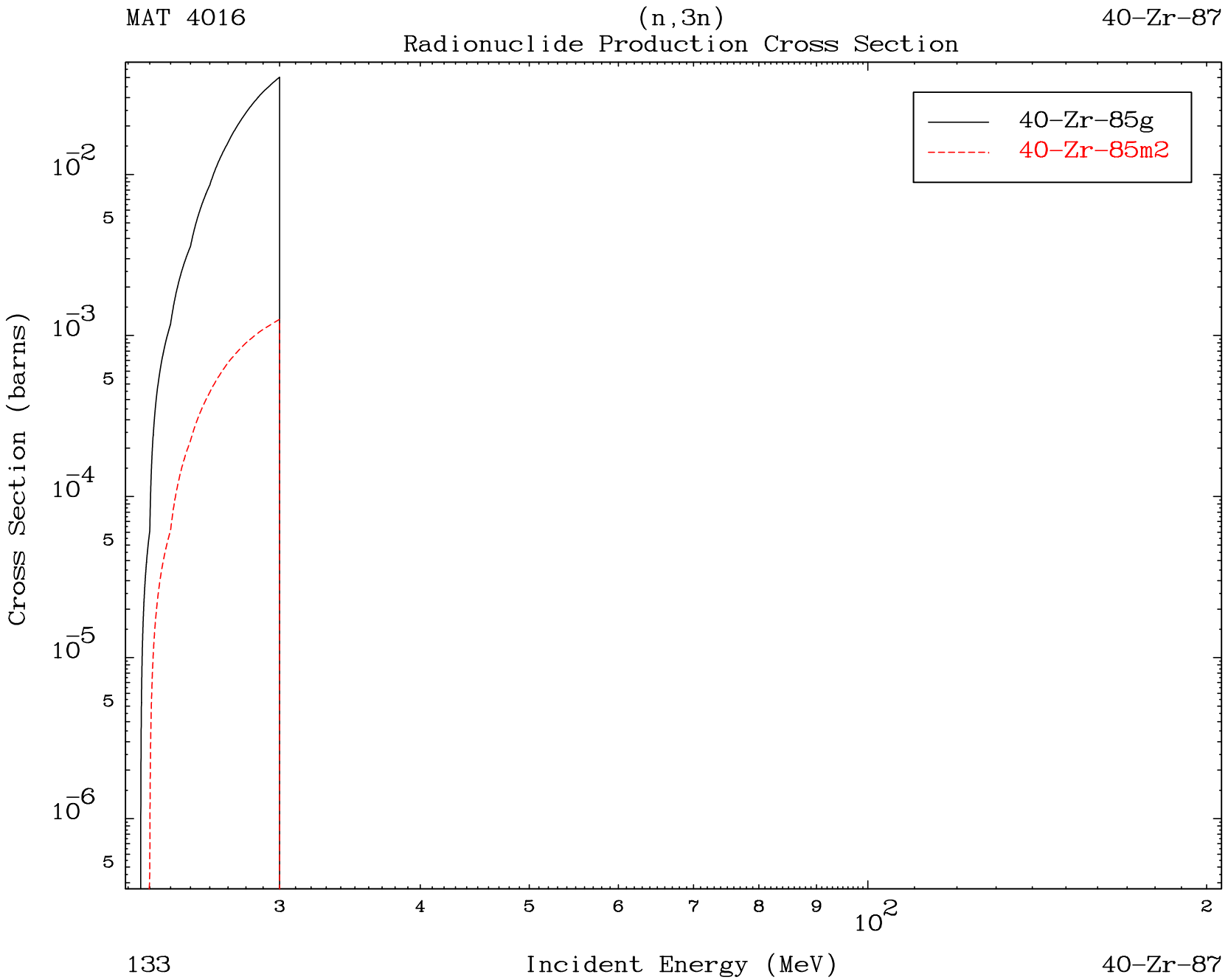

MAT 4016
MT= 78 (n,n') Level
Legendre Coefficients
40-Zr-87
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.025
0.020
0.015
0.010
0.005
0.000
-0.005
Legendre (CM)
0
50
100
150
200
128
Incident Energy (MeV)
40-Zr-87

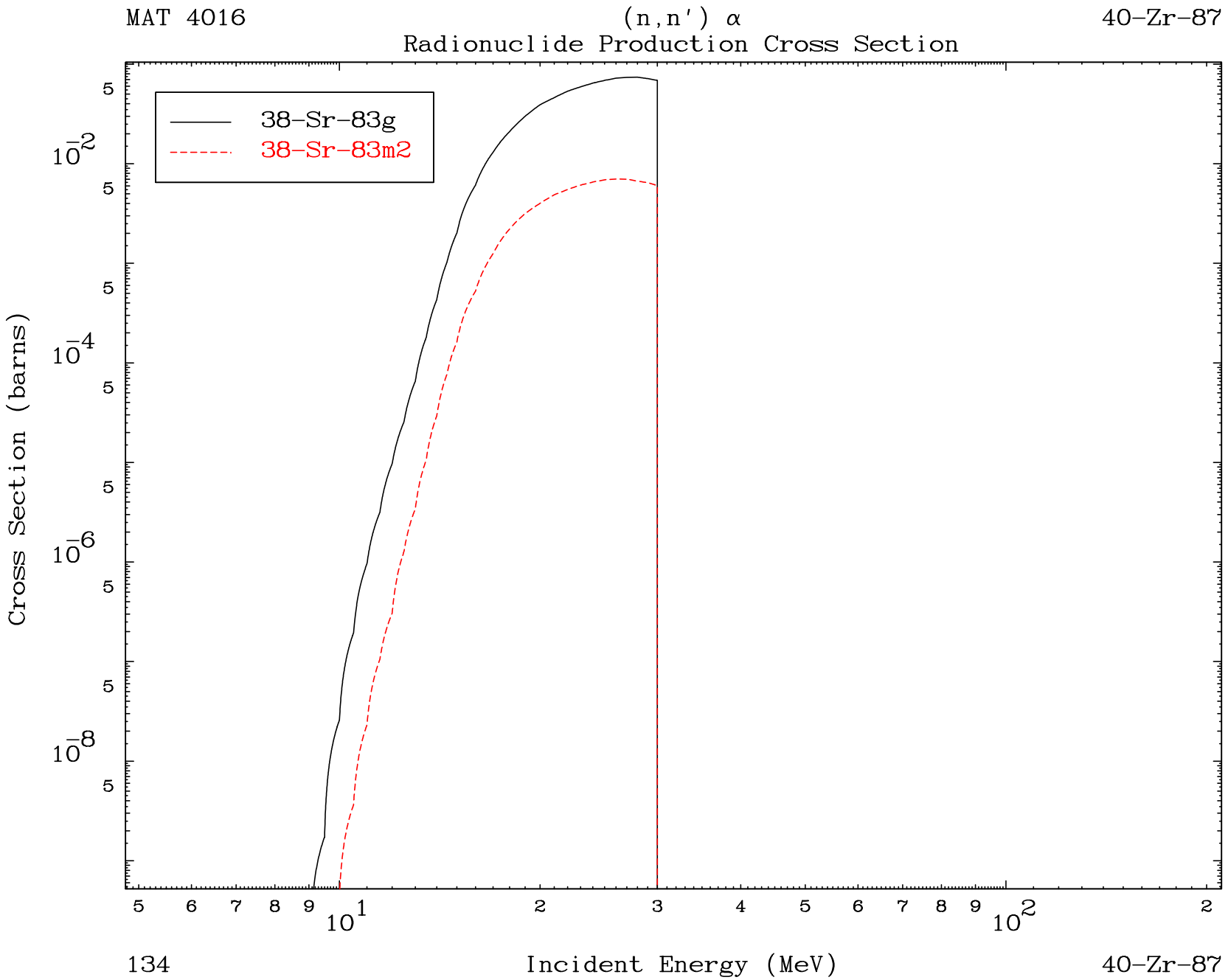

MAT 4016
MT= 78 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-4
5
4
3
2
1
0
Legendre (CM)
P19
P20
P21
P22
P23
P24
P25
P26
P27
50
100
150
200
129
Incident Energy (MeV)
40-Zr-87

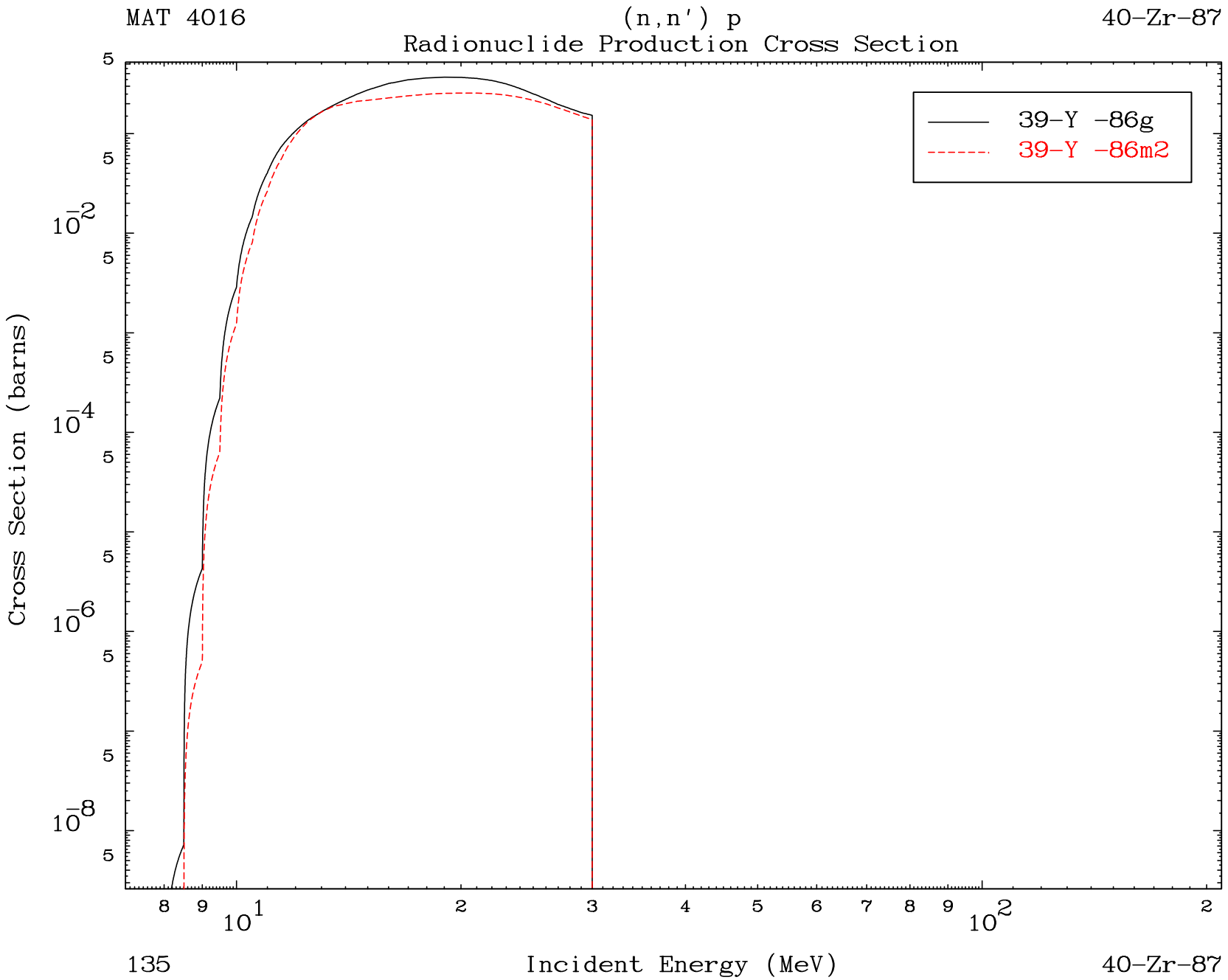

MAT 4016
MT= 78 (n,n') Level
Legendre Coefficients
40-Zr-87
X10-7
2.0
1.5
1.0
0.5
0.0
Legendre (CM)
P28
P29
P30
P31
P32
P33
P34
50
100
150
200
130
Incident Energy (MeV)
40-Zr-87

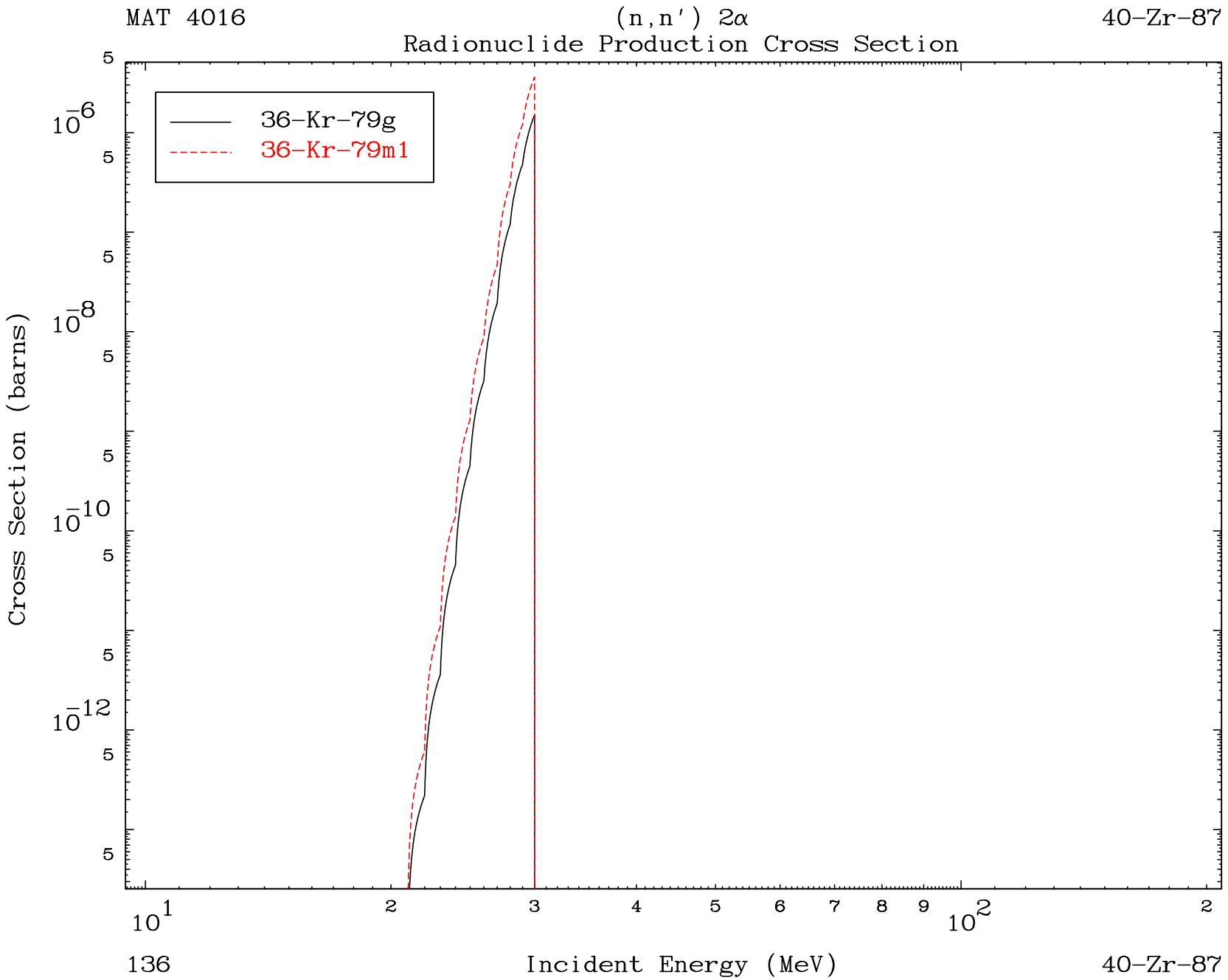

MAT 4016
Inelastic
40-Zr-87
Radionuclide Production Cross Section
Cross Section (barns)
40-Zr-87g
40-Zr-87m2
Incident Energy (MeV)
131
40-Zr-87

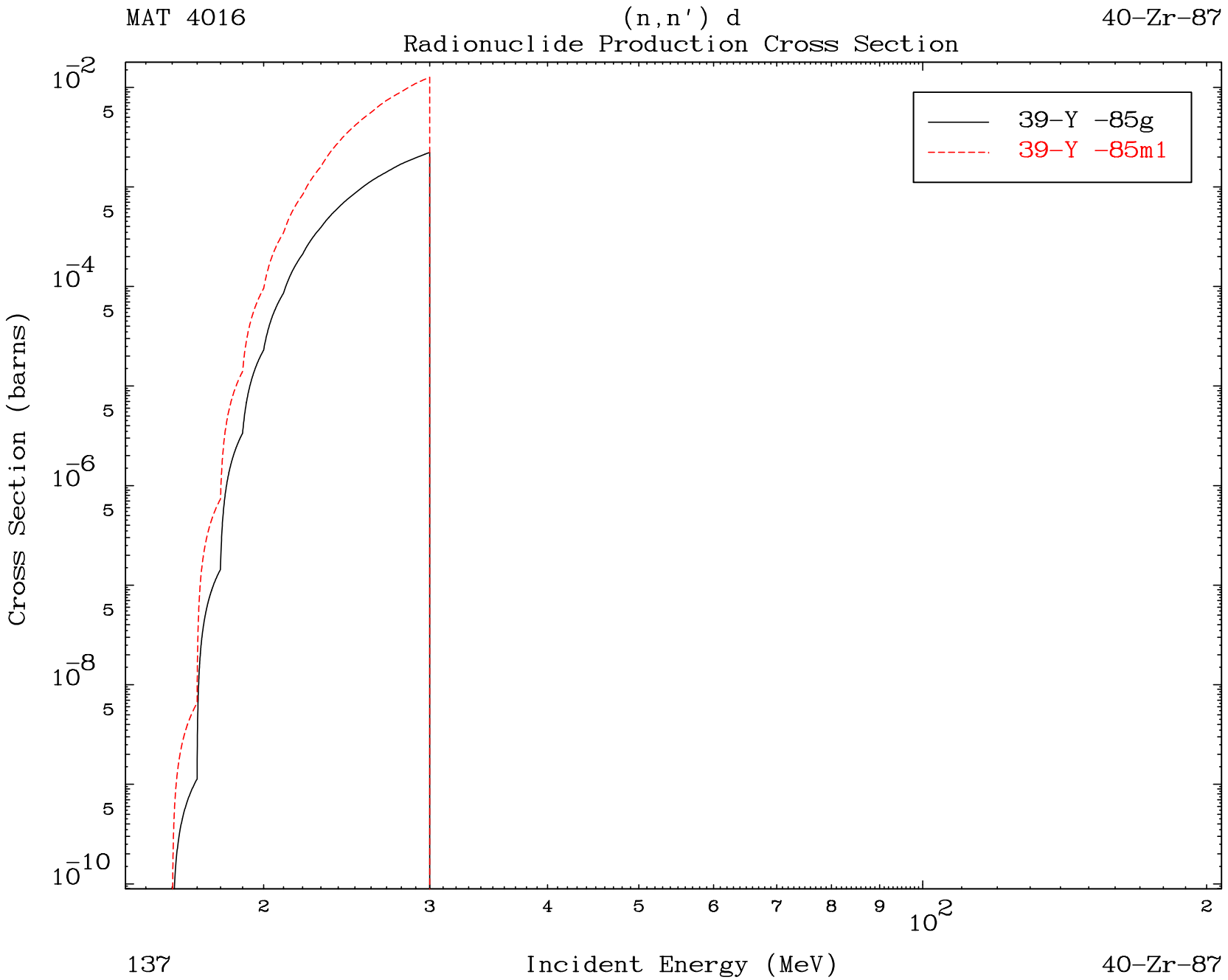

MAT 4016
(n,2n) d
40-Zr-87
Radionuclide Production Cross Section
39-Y -84g
39-Y -84m2
Cross Section (barns)
10-8
10-10
10-12
10-14
5
3
4
5
6
7
8
9
10 2
2
132
Incident Energy (MeV)
40-Zr-87

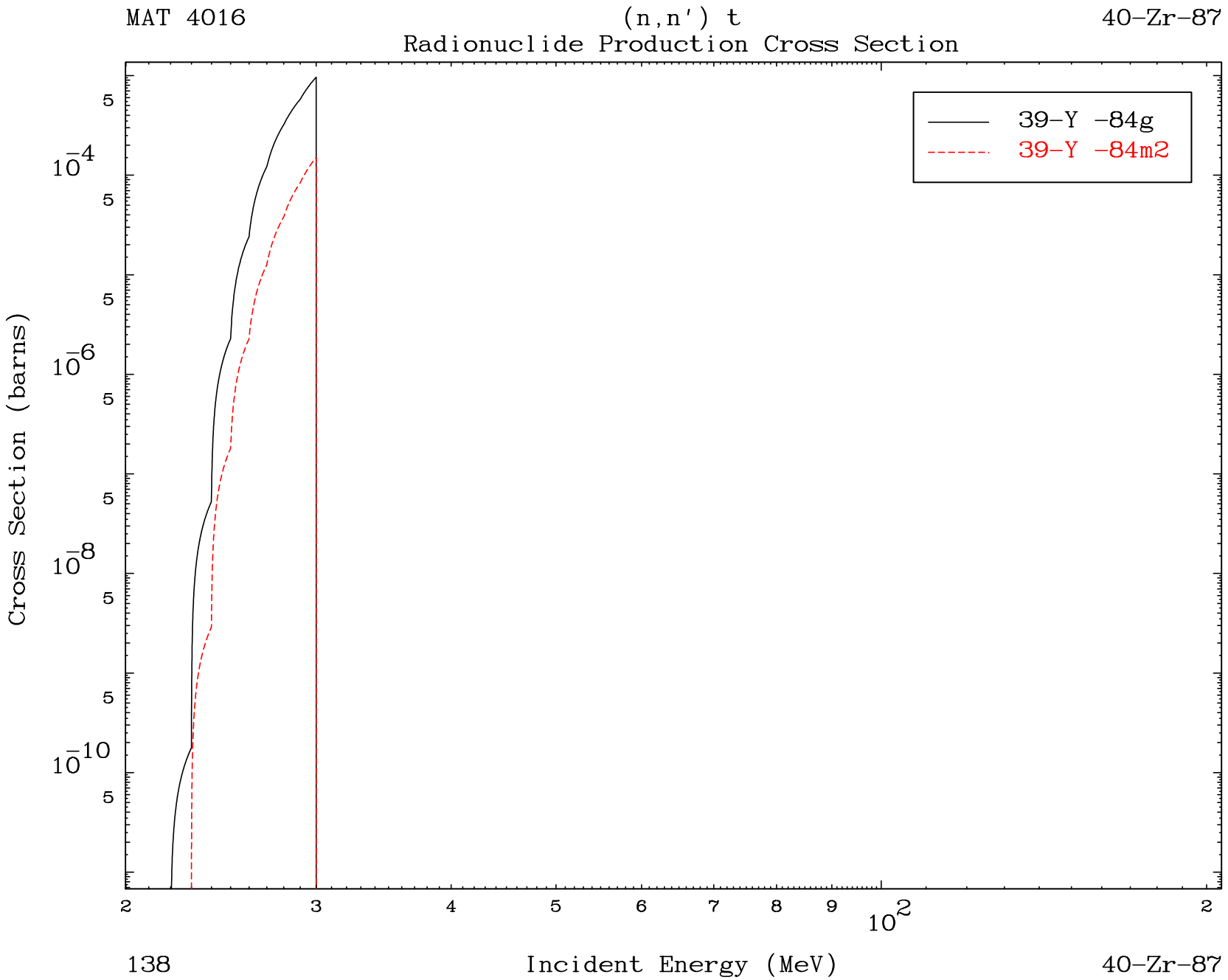

MAT 4016
(n,3n)
40-Zr-87
Radionuclide Production Cross Section
40-Zr-85g
40-Zr-85m2
Cross Section (barns)
10-2
10-3
10-4
10-5
10-6
5
3
4
5
6
7
8
9
10^2
2
133
Incident Energy (MeV)
40-Zr-87

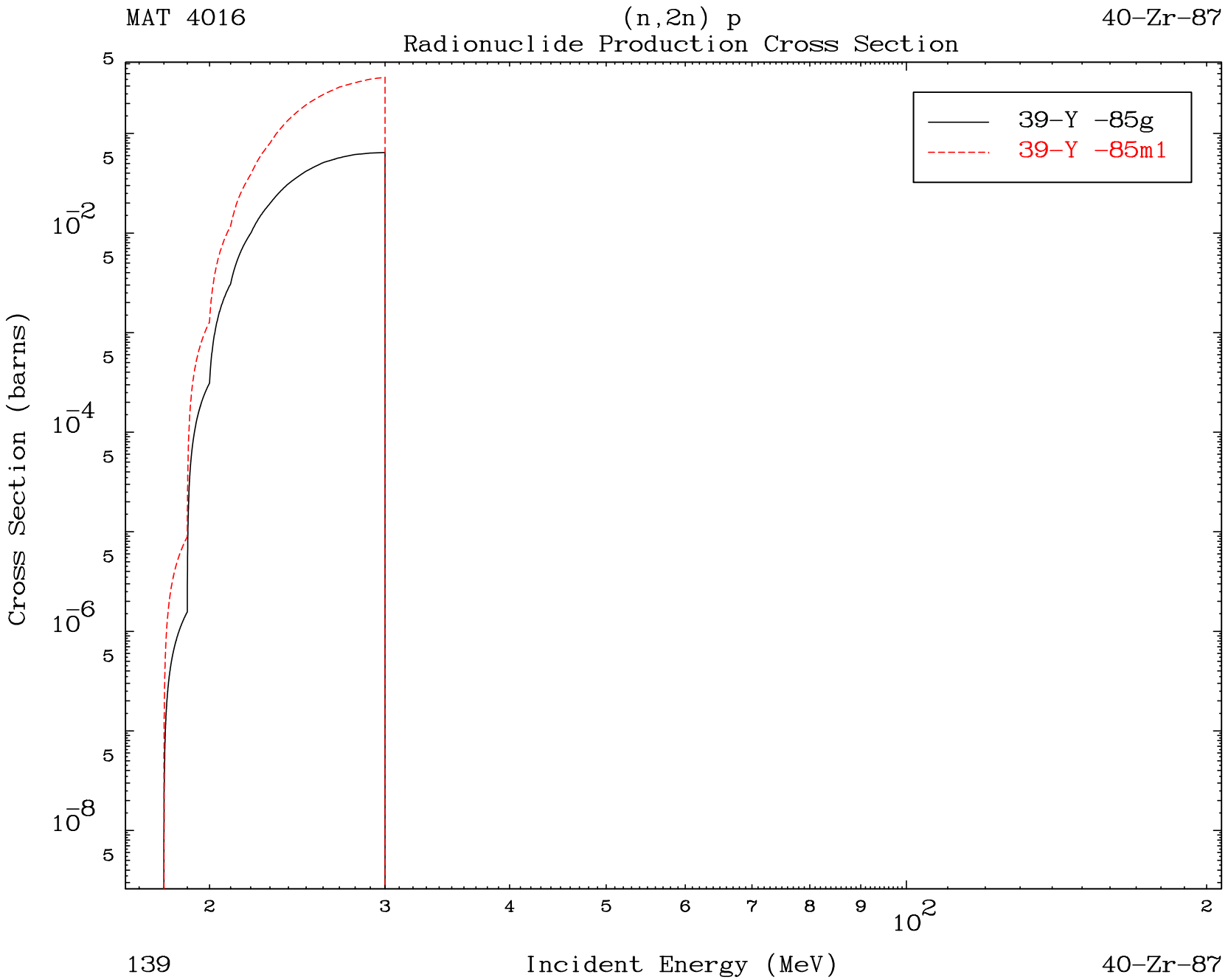

MAT 4016
(n,n') α
40-Zr-87
Radionuclide Production Cross Section
38-Sr-83g
38-Sr-83m2
Cross Section (barns)
Incident Energy (MeV)
134
40-Zr-87

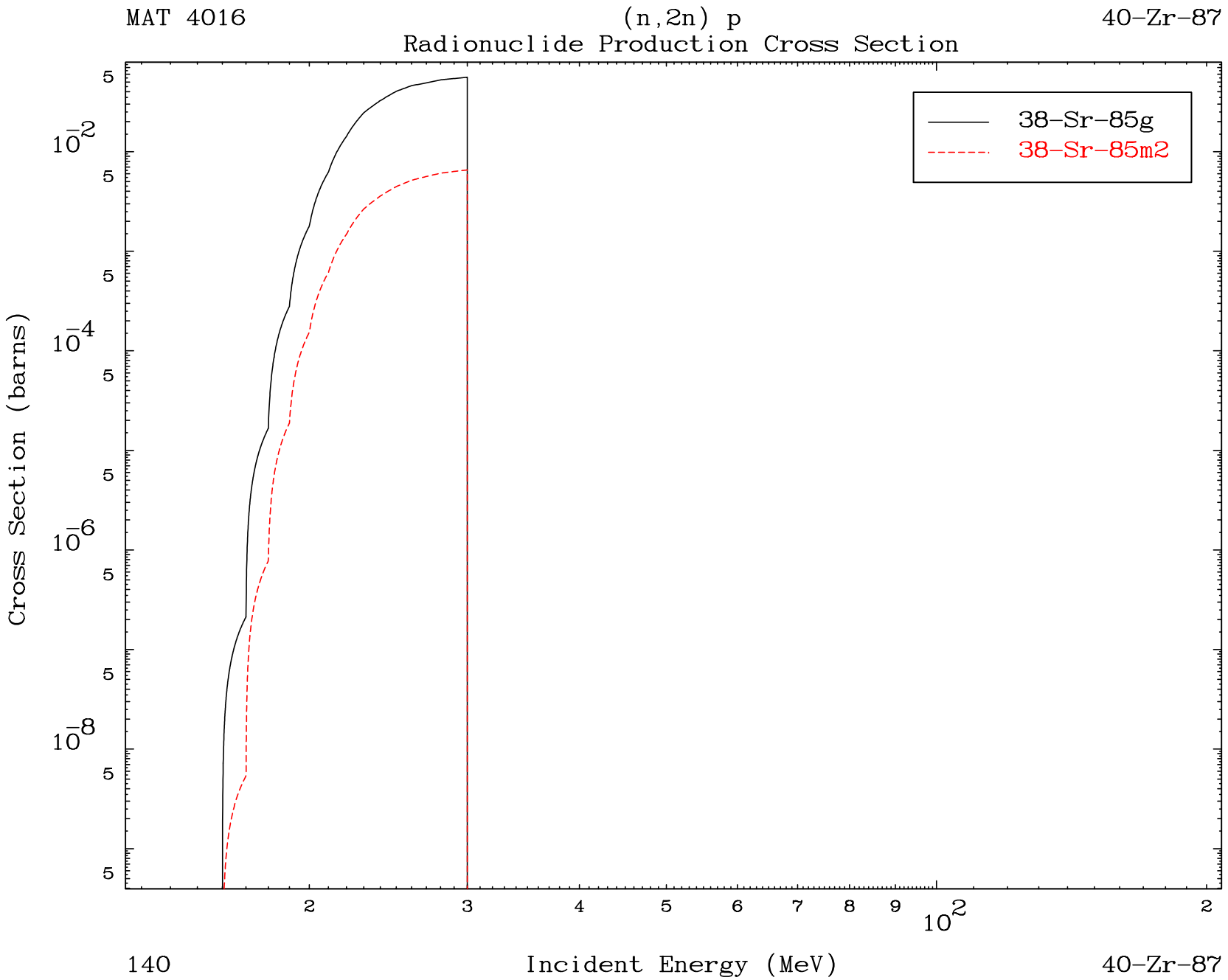

MAT 4016
(n,n') p
40-Zr-87
Radionuclide Production Cross Section
39-Y -86g
39-Y -86m2
Cross Section (barns)
Incident Energy (MeV)
135
40-Zr-87

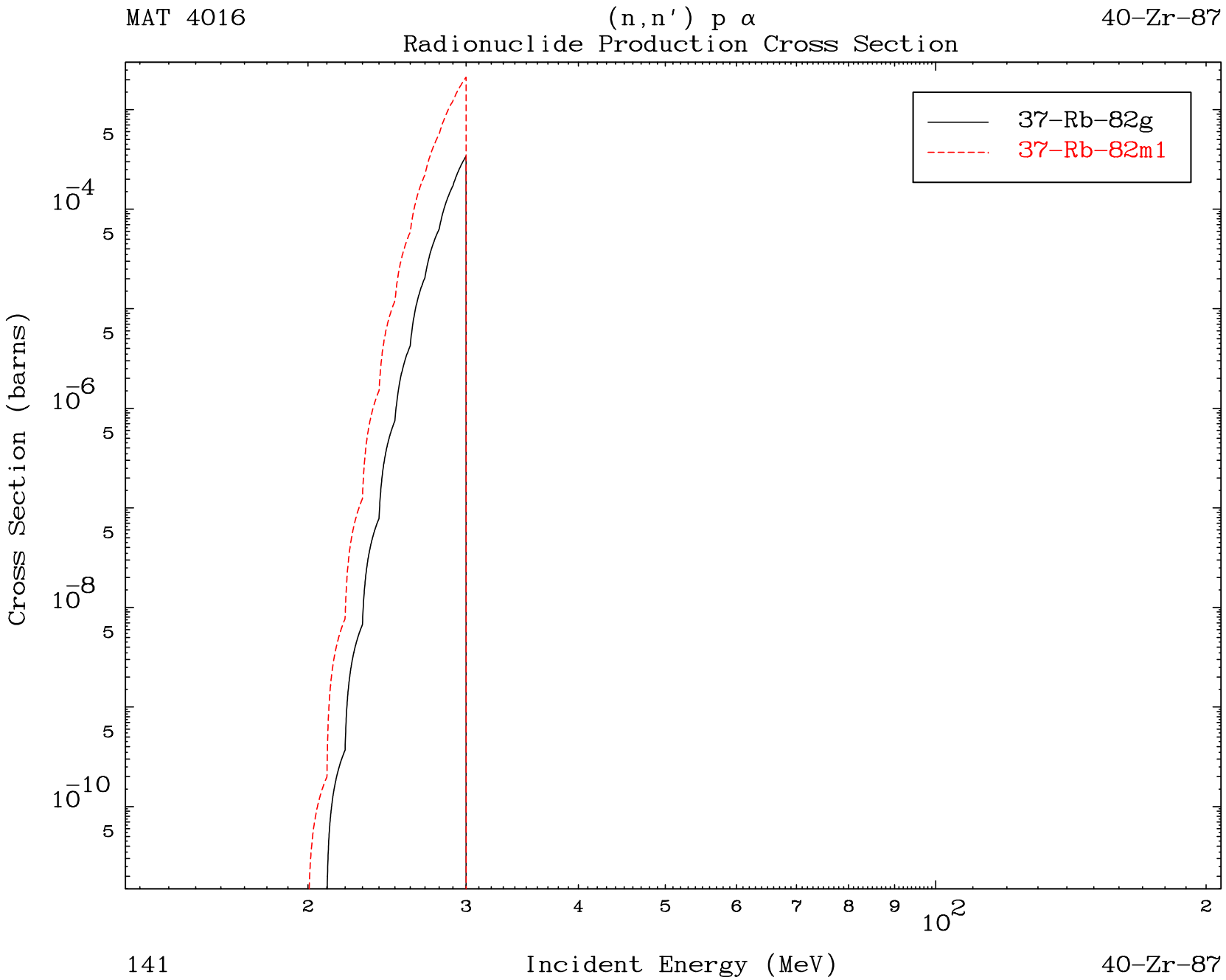

MAT 4016
(n,n') 2α
40-Zr-87
Radionuclide Production Cross Section
36-Kr-79g
36-Kr-79m1
Cross Section (barns)
Incident Energy (MeV)
136
40-Zr-87

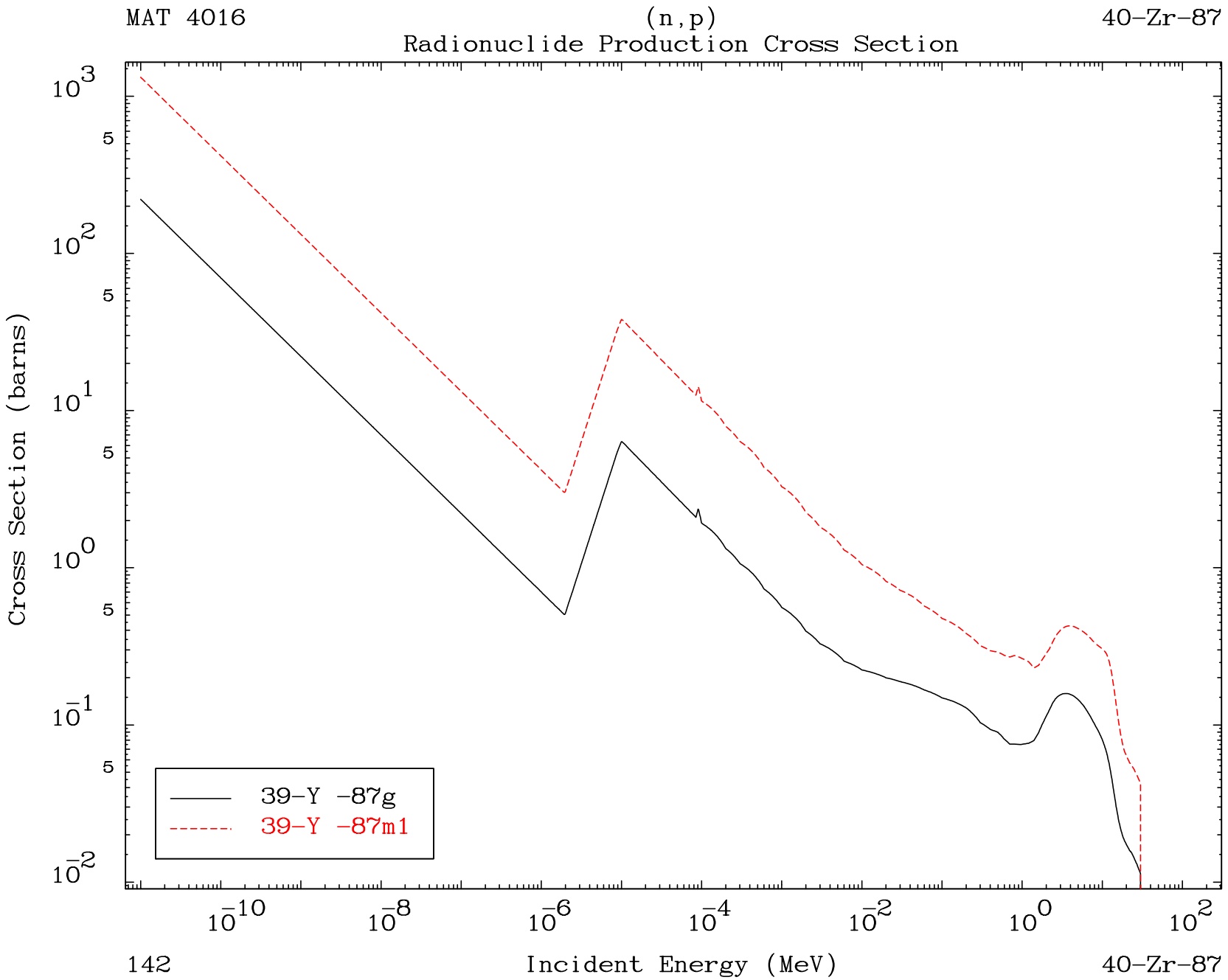

MAT 4016
(n,n') d
40-Zr-87
Radionuclide Production Cross Section
39-Y -85g
39-Y -85m1
Cross Section (barns)
Incident Energy (MeV)
137
40-Zr-87

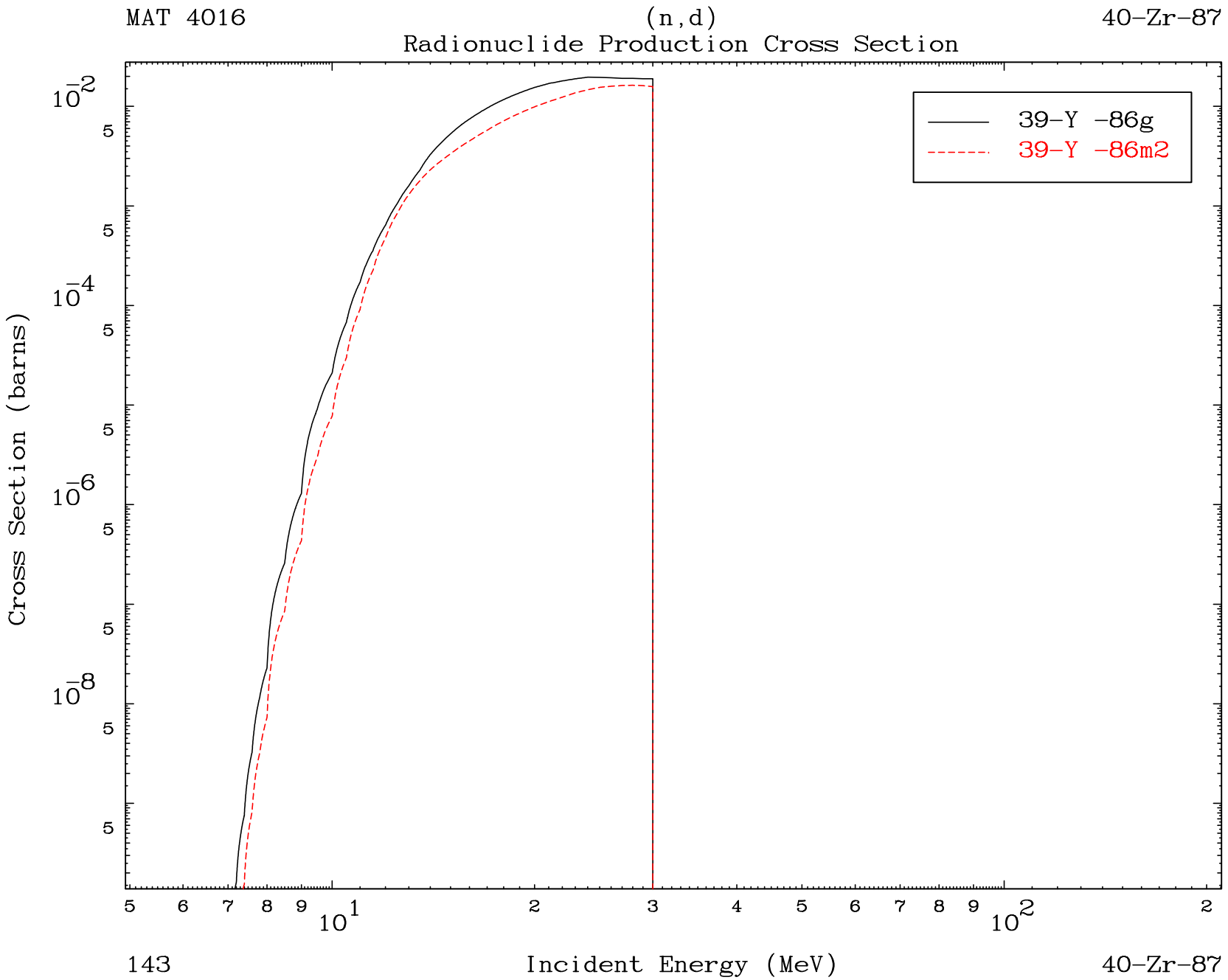

MAT 4016
(n,n') t
40-Zr-87
Radionuclide Production Cross Section
39-Y -84g
39-Y -84m2
Cross Section (barns)
10-4
10-6
10-8
10-10
2
3
4
5
6
7
8
9
10 2
2
138
Incident Energy (MeV)
40-Zr-87

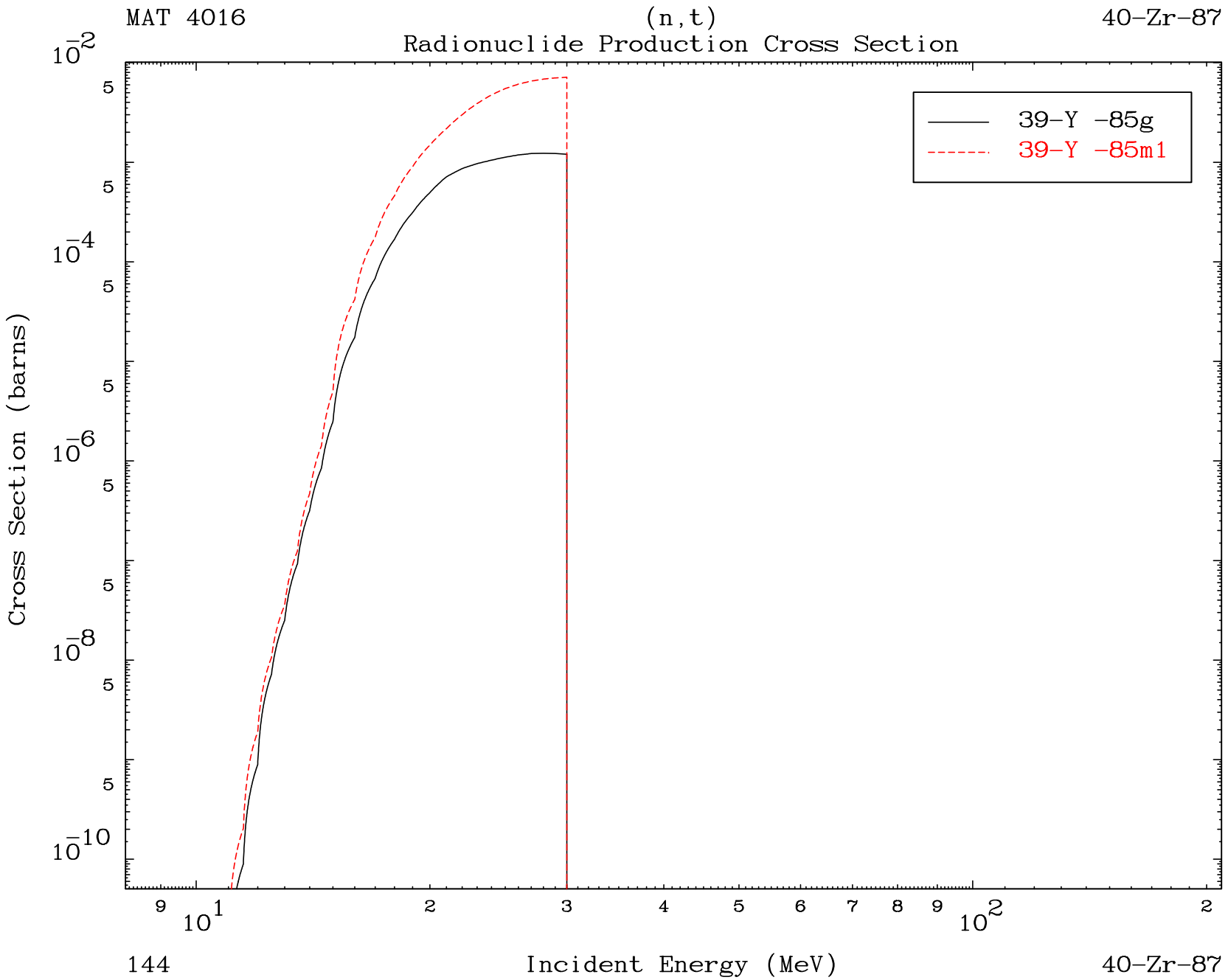

MAT 4016
(n,2n) p
40-Zr-87
Radionuclide Production Cross Section
39-Y -85g
39-Y -85m1
Cross Section (barns)
10-2
10-4
10-6
10-8
2
3
4
5
6
7
8
9
10 2
2
139
Incident Energy (MeV)
40-Zr-87

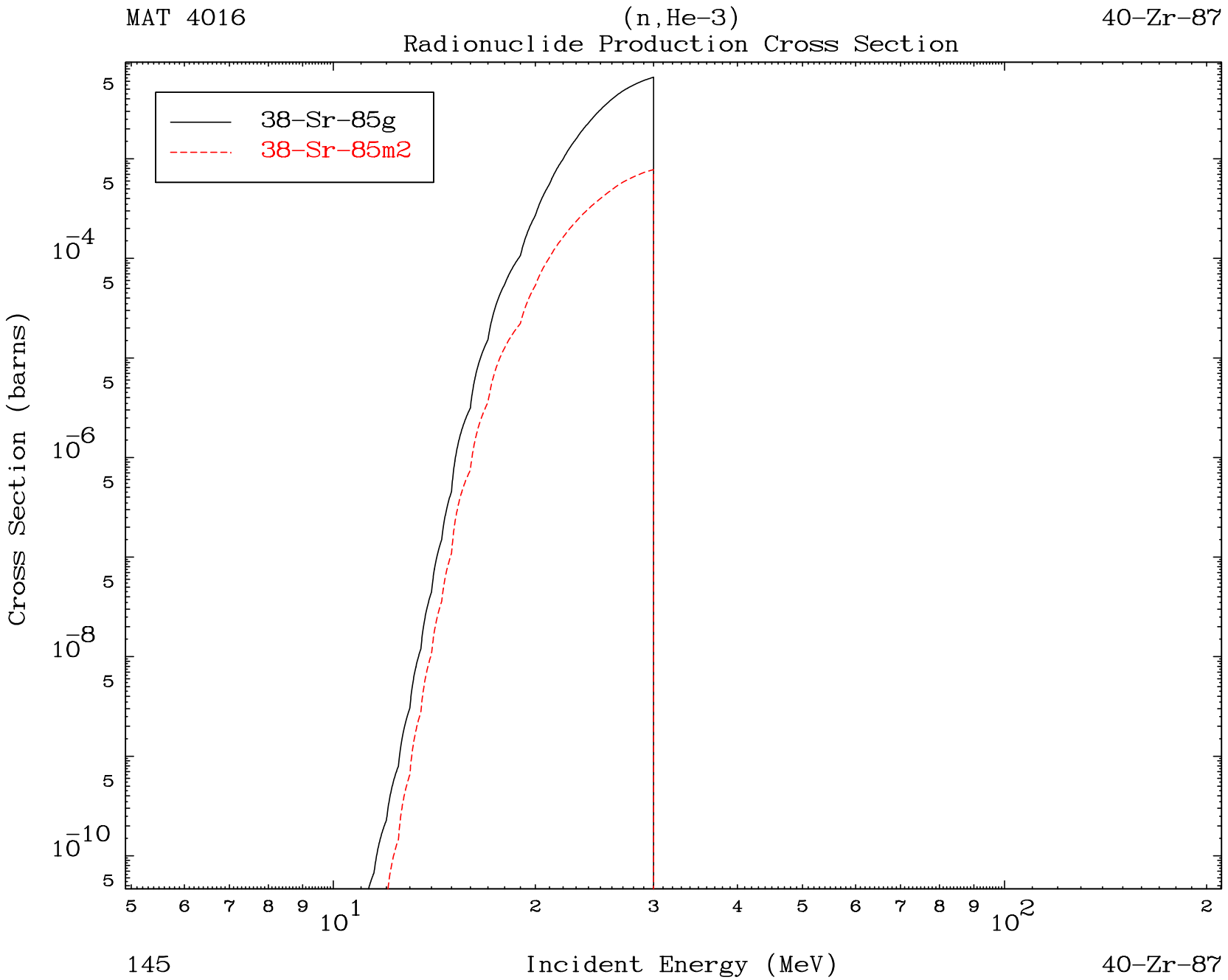

MAT 4016
(n,2n) p
40-Zr-87
Radionuclide Production Cross Section
38-Sr-85g
38-Sr-85m2
Cross Section (barns)
10-2
10-4
10-6
10-8
5
2
3
4
5
6
7
8
9
10 2
2
140
Incident Energy (MeV)
40-Zr-87

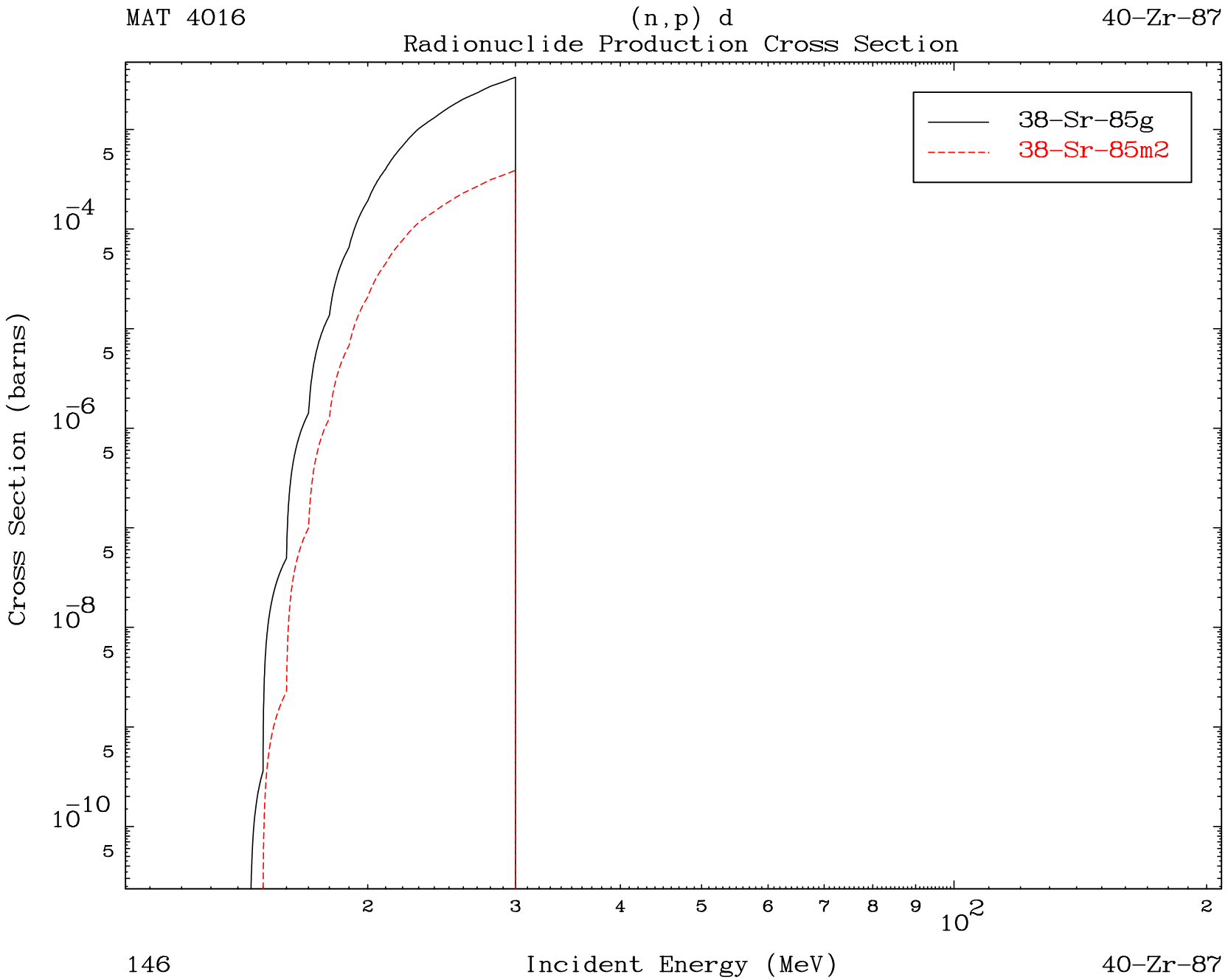

MAT 4016
(n,n') p α
40-Zr-87
Radionuclide Production Cross Section
37-Rb-82g
37-Rb-82m1
Cross Section (barns)
10-4
10-6
10-8
10-10
2
3
4
5
6
7
8
9
10 2
141
Incident Energy (MeV)
40-Zr-87

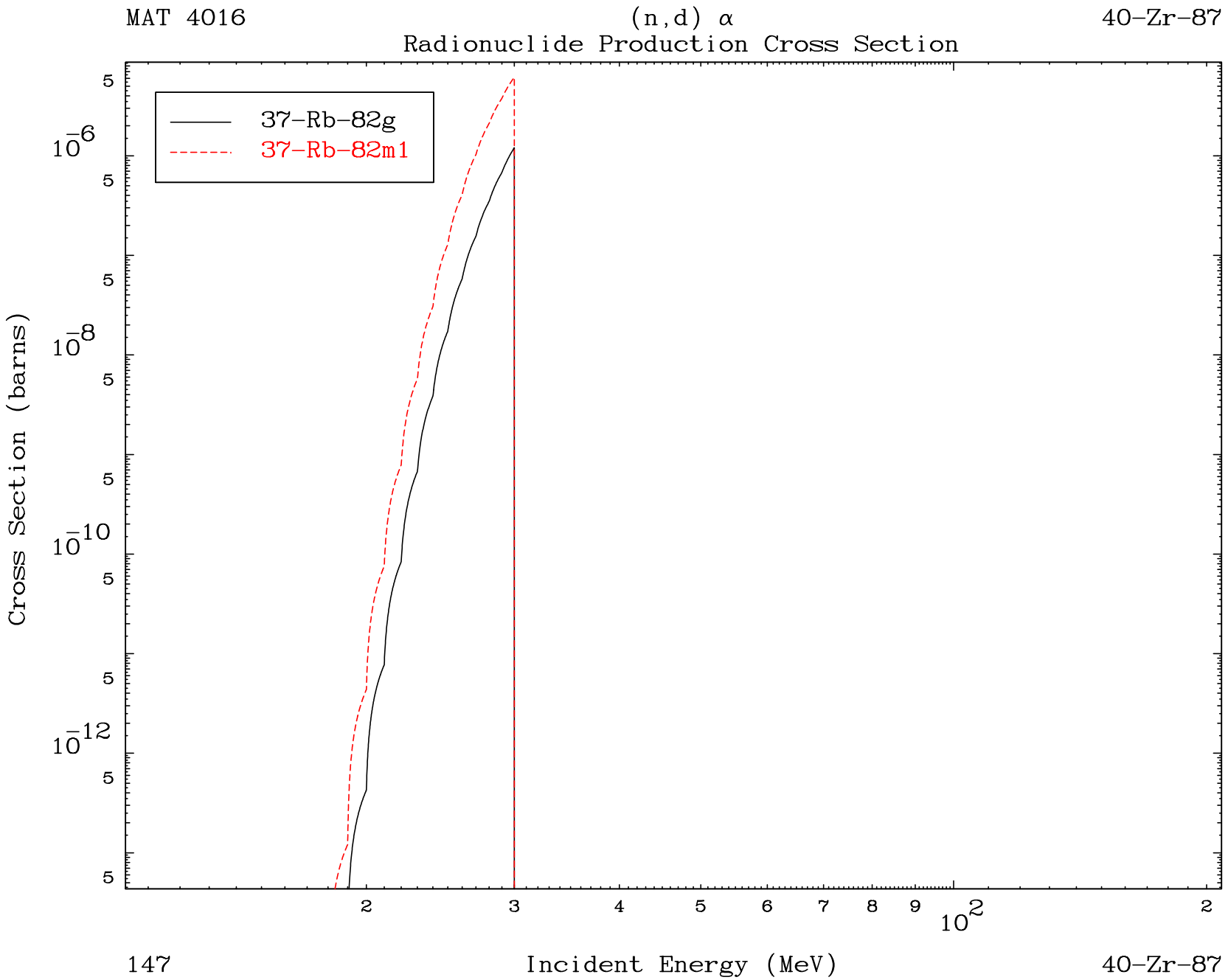

MAT 4016
(n,p)
40-Zr-87
Radionuclide Production Cross Section
Cross Section (barns)
10^3
10^2
10^1
10^0
10^-1
10^-2
5
10^-10
10^-8
10^-6
10^-4
10^-2
10^0
10^2
39-Y -87g
39-Y -87m1
142
Incident Energy (MeV)
40-Zr-87


MAT 4016
(n,d)
40-Zr-87
Radionuclide Production Cross Section
39-Y -86g
39-Y -86m2
Cross Section (barns)
Incident Energy (MeV)
143
40-Zr-87


MAT 4016
(n,t)
40-Zr-87
Radionuclide Production Cross Section
39-Y -85g
39-Y -85m1
Cross Section (barns)
Incident Energy (MeV)
144
40-Zr-87


MAT 4016
(n,He-3)
40-Zr-87
Radionuclide Production Cross Section
38-Sr-85g
38-Sr-85m2
Cross Section (barns)
Incident Energy (MeV)
145
40-Zr-87


MAT 4016
(n,p) d
40-Zr-87
Radionuclide Production Cross Section
38-Sr-85g
38-Sr-85m2
Cross Section (barns)
10-4
10-6
10-8
10-10
5
2
3
4
5
6
7
8
9
10 2
2
146
Incident Energy (MeV)
40-Zr-87


MAT 4016
(n,d) α
40-Zr-87
Radionuclide Production Cross Section
37-Rb-82g
37-Rb-82m1
Cross Section (barns)
10-6
10-8
10-10
10-12
5
2
3
4
5
6
7
8
9
10^2
2
147
Incident Energy (MeV)
40-Zr-87