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Proposal for a new lecture on

“Introduction to nuclear interaction: from reactors to stars”

Why “nuclear data” in nuclear engineering ?

- Nuclear data is a general term referring to probability of physical interaction between atomic particles (e.g. cross sections, emitted spectra, angular/energy distributions, decay data)
- They are the essential ingredients for
 - Design/operation of nuclear power plants
 - Management of nuclear waste
 - Production of medical radioisotopes
 - Astrophysical quantities
- There is currently no course on nuclear data at the EPFL/ETH Masters (Physics, or engineering).
- A broad introduction to the “nuclear data life cycle” is therefore proposed

Overview of the course (14 weeks), 4 credits

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| 1. Nuclear data needs | 2 lectures: 2 x (2h + 2h) |
| a) Energy | |
| b) Medical | |
| c) Astrophysics | |
| 2. Theoretical background | 2 lectures: 2 x (2h + 2h) |
| a) Neutron cross sections | |
| b) Emitted particles, spectra | |
| c) Fission yields | |
| d) Charged-particle induced reactions | |
| 3. Measurement facilities | 2 lectures: 2 x (2h + 2h) |
| a) Accelerators | |
| b) Reactors | |
| 4. Evaluation | 3 lectures: 3 x (2h + 2h) |
| a) International network | |
| b) Methods and Tools | |
| c) Libraries | |
| 5. Application | 5 lectures: 5 x (2h + 2h) |
| a) Processing | |
| b) Energy, waste | |
| c) Reaction rates in stars | |
| d) Radio-isotopes for medical applications | |

