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2nd IAEA Technical Meeting on Reactor Antineutrino Spectra Applications

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Background

- 1st IAEA Technical Meeting on Antineutrino spectra and their applications, 23-26 April 2019
  - Reactor antineutrino measurements for basic science (SM, BSM) and applications (nonproliferation)
  - Flux and spectrum modelling (Conversion, Summation)
  - Nuclear data needs
- Summary report: INDC(NDS)-0786

Reactor antineutrino measurements – outstanding issues

- RAA – origin of discrepancy
- eV-scale sterile neutrinos
- Level of precision, fine structure
- Energies below 1.8 MeV
- Only HEU, LEU- other types of reactors?
- NOT all published antineutrino data and metadata are available in tabulated e-form
- Up-to-date summation models not easily accessible

Modelling (conversion, summation) – outstanding issues AND nuclear data

- Uncertainty quantification in CM and SM
- Fission yield data (isomeric ratios): new measurements and evaluations
- Forbidden non-unique shape factors (new measurements, theory and validation)
- Integral beta spectra (new measurements)
- Predictive nuclear models

Data standardization and dissemination

- Standard plots and formats for flux/spectrum
- Use of peer-reviewed published data and tabulated results
- Standards, processing, and locations for permanent public storage and access

Discussions/Recommnendations

- Discussions benefit from international coordination
- Create Working Group (Antineutrino Flux Working Group):
  - Standardized antineutrino data
  - Standardized models
  - Antineutrino model input nuclear data and experiment

Since 2019

- SNOWMASS 2021 White Paper, “HEP Physics Opportunities Using Reactor Antineutrinos, arXiv:2203.07214v1 March 2022
- Nu Tools: Exploring Practical Roles for Neutrinos in Nuclear Security, Akindele et al., 2021 (arXiv:2112.12593)
- WoNDRAM 2021 (virtual): C. Romano et al., 2022, “Nuclear Data to Reduce Uncertainties in reactor Antineutrino Measurements”

Present meeting: goals

- Review status

Presentations, Q&A, Roundtable

- Revise scientific goals and approaches (R&D)
- Revise data needs
- Revisit previous recommendations - formulate new ones
- Propose specific actions

Roundtable, draft recommendations

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Thank you!