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Neutron Cross Section Covariances: Recent Workshop and Advanced Reactor Systems

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The recent Workshop on Neutron Cross Section Covariances, organized by BNL and attended by more than 50 scientists, responded to demands of many user groups, including advanced reactor systems, for uncertainty and correlation information. These demands can be explained by considerable progress in advanced neutronics simulation that probe covariances and their impact on design and operational margins of nuclear systems. The Workshop addressed evaluation methodology, recent evaluations as well as user's perspective, marking era of revival of covariance development that started some two years ago. We illustrate urgent demand for covariances in the case of advanced reactor systems, including fast actinide burner under GNEP, new generation of power reactors, Gen-IV, and reactors under AFCL. A common feature of many of these systems is presence of large amount of minor actinides and fission products that require improved nuclear data. Advanced simulation codes rely on quality input, to be obtained by adjusting the data library, such as the new ENDF/B-VII.0, by considering integral experiments as currently pursued by GNEP. To this end the nuclear data community is developing covariances for formidable amount of 112 materials (isotopes).

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