Overview and Validation of the CEM03.01 and LAQGSM03.01 Event Generators for MCNP6, MCNPX, and MARS15

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A brief description of the IntraNuclear cascade, preequilibrium, evaporation, fission, coalescence, and Fermi breakup models used by our CEM03.01 and LAQGSM03.01 event generators is presented, with a focus on our latest development of all these models. The recently developed "S" and "G" versions of our codes, that consider multifragmentation of nuclei formed after the preequilibrium stage of reactions when their excitation energy is above $2A$ MeV using the Statistical Multifragmentation Model (SMM) code by Botvina *et al.* ("S" stands for SMM) and the fission-like binary-decay model GEMINI by Charity ("G" stands for GEMINI), respectively, are overviewed as well. Examples of benchmarking our models against a large variety of experimental data on particle-particle, particle-nucleus, and nucleus-nucleus reactions at energies from $\simeq$ 10 MeV/A to $\simeq$ 1 TeV/A, involving the recent CERN NA49 and HARP experiments, included officially into the "Grand Validation" list of our HSS06 workshop, are presented.

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