derived by us would serve as corrections even on prompt neutron time scales. The Langevin approach is capable of correctly describing the non-Markov process resulting from a non-Poisson source. We have shown that a complete description of the spallation neutron source is possible by treating it as a combination of an internal noise given by the Schottky prescription and another that is of external origin arising from the proton beam. With such a description, we have obtained the PSD of ADS reactor noise complete with delayed neutrons, finite pulsed width, and correlations if any between proton pulses. The simulator gives a fairly realistic picture of the kind of results that may be expected with regard to the errors and the accuracy that may be expected from actual measurements. Simulations of proposed Purnima sub-critical assemblies show that proper location of detectors gives an almost single exponential (fundamental mode) response making alpha measurements by the noise methods possible even in deeply sub-critical systems.

Further studies on the subject can be carried out along the lines given below.

If noise methods are to be used for sub-criticality measurements, experimental studies on the statistical characteristics of the proton bunches should be carried out. Since the Feynman alpha method has been studied in several experimental facilities, it would be worthwhile to look for non-Poisson behavior of the source. A study of the variation of the Feynman Y function with the degree of sub-criticality would bring out the relative contributions from the external source and from the fission source. It is also important to study the current fluctuation statistics of ion beams from accelerators, either theoretically or experimentally. Our treatment of reactor noise in ADS is limited to very low power systems and we have completely disregarded the effects of thermal hydraulic feedbacks and other noise sources which are expected to be important in an operating power reactor. It will be worthwhile to investigate these effects. Finally, development of a robust procedure for diffusion in multi-media, and which does not use numerical approximations such as finite differencing, remains
an interesting problem which needs to be studied further. A more accurate simulation of the process using time dependent analogue Monte Carlo is being attempted (Singh and Degweker).

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