Sensitivity of ^{252}Cf(sf) Neutron Observables to FREYA Inputs[1] RA-
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tory — Within the framework of the fission event generator FREYA, (Fission Reaction
Event Yield Algorithm) we have studied the sensitivity of various neutron observ-
ables to the yield distribution $Y(A, Z, \text{TKE})$ used as input to the code. Concen-
trating on the spontaneous fission of ^{252}Cf, we generate a large number of different
input yield distributions by performing simultaneous variations in the mass and
charge yields as well as the kinetic energy distribution, governed by yield covariance
matrices established from experimental data sets. For each of these input yield dis-
tributions, we then use FREYA to generate a large sample of complete fission events
from which we extract various neutron observables, in particular the neutron mul-
tiplicity distribution, and the neutron spectrum associated with each multiplicity.
On this basis, we are able to determine the sensitivity of those observables to the
uncertainties in the input yield distribution obtained experimentally. This kind of
study can be applied to any other case of interest and the information obtained can
help to establish any needs and target accuracies required for further measurements
to ensure reliable data validation.

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