

Abstract Submitted  
for the APR20 Meeting of  
The American Physical Society

**Nuclear data as touchstone and measurand in the establishment, comparison, and dissemination of activity standards for  $^{224}\text{Ra}$** <sup>1</sup> DENIS BERGERON, JEFFREY CESSNA, RYAN FITZGERALD, LETICIA PIBIDA, National Institute of Standards and Technology, Gaithersburg, MD 20899, USA, SEAN COLLINS, National Physical Laboratory, Teddington, Middlesex TW11 0LW, UK, ELISA NAPOLI, Oncoinvent AS, Oslo, Norway; University of Oslo, Oslo, Norway — Radium-224 decays by alpha emission with a half-life of 3.631(2) d, approaching secular equilibrium with its progeny approximately 6 d after separation from its  $^{228}\text{Th}$  parent. Like some other alpha-emitting nuclides,  $^{224}\text{Ra}$  is currently being investigated for applications in molecular radiotherapy of various forms of cancer. In such applications, understanding dose-response relationships requires accurate activity assays. We address some challenges in assaying a nuclide approaching or at equilibrium with short-lived progeny, with focus on nuclear data considerations. Half-lives govern the relative abundances of the progeny, while the gamma-ray emission probabilities underlie common clinical activity measurements. We treat the  $\gamma_{1,0}(\text{Rn})$  (241 keV) emission as both a point of reference for a bilateral intercomparison and, then, as a measurand. We assess equivalence between the USA and UK standards for  $^{224}\text{Ra}$  activity and report new values for the  $^{224}\text{Ra}$  half-life and  $\gamma_{1,0}(\text{Rn})$  emission probability.

<sup>1</sup>This work was funded in part by Oncoinvent AS, Norway. EN is employed by and owns stock in Oncoinvent AS, Norway. EN was supported by the Industrial PhD project n.259820/030 of the Norwegian National Research Council.

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Date submitted: 23 Dec 2019

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