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ORAL PRESENTATION - Decay data measurements on ²¹³Bi using recoil atoms

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²¹³Bi is one of the most important &alpha-emitting nuclides used in targeted alpha therapy (TAT) against cancer. It is readily available from the subsequent &alpha-decay of ²²⁵Ac → ²²¹Fr → ²¹⁷At → ²¹³Bi. The parent half-life is T_{1/2}(²²⁵Ac)=9.920 (3) d (Pommé et al., in press), while ²²¹Fr and ²¹⁷At are shorter-lived. ²¹³Bi has a half-life of about 45.6 min and decays to the longest-lived alpha emitter ²⁰⁹Bi through two branches, each involving one &alpha-decay and two &beta-decays. An IAEA Coordinated Research Project has identified the need for a new half-life measurement of ²¹³Bi.

In this work, ²¹³Bi has been separated from an open 225Ac source by collecting recoil atoms onto a glass plate in vacuum. The activity of such recoil sources has been followed as a function of time, using an ion-implanted planar Si detector in quasi-2&pigreco geometry, resulting in a new half-life value. Additional high-resolution alpha-spectrometry measurements were performed at a solid angle of 0.4% of 4π sr, to verify the energies and emission probabilities of the &alpha-emissions from the decay products of ²²⁵Ac. For both experiments, a description of the measurement method and data analysis is provided. The resulting decay data are given with an uncertainty budget and compared with literature values.

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