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ToF and molecular beam studies of the on-line beam with the Isolde RFQ beam-cooler

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A new high-sensitivity time-of-flight detector has been designed and installed in the Isolde beamline, permitting study of the time structure of the on-line beam for the first time. The detector uses secondary electron emission and an MCP read-out to create a robust but highly-sensitive detector with a response time of 0.5 ns.

The detector is 10 m downstream of the RFQ extraction point, allowing us to measure the mass composition of the RFQ beam. This allows us to study cooled molecular beams, which may suffer collisional decomposition during the cooling process. We present the results of the first systematic study of the effects of the RFQ on molecular beams under varying conditions.

The new detector also allows us to adapt the RFQ bunching to the particular needs of the downstream user. We present the effects of different RFQ tunes, optimised for low energy-spread or for short bunch widths.

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