A C-14 beam monitor using silicon solid state sensor for cultural heritage

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We report the design and preliminary test results of a C-14 beam monitor developed for the online monitoring for radiocarbon dating. The challenge of the INFN CHNet_Lilliput experiment is to measure the amount of carbon in very small samples (down to a few micro-grams) with a very low concentration of radiocarbon. For this purpose, a new dedicate beam monitor for C-14 ions (energy around 10 MeV) uses a silicon solid state detector made of 4 independent sectors, active area 50x50mm^2 and 300micrometer thickness. The detector is preliminary tested in the INFN Laboratory of Bari and then installed on the final part of the Accelerator Mass Spectrometry (AMS) beam line at the INFN-Labec laboratory of Florence (Italy) where since 2004, sample measurements for radiocarbon dating are performed.