New ^{14}C mass spectrometry

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Positive-ion mass spectrometry (PIMS) is a recently invented variant of accelerator mass spectrometry (AMS) that simplifies and extends radiocarbon measurement [1].

PIMS suppresses the interferences to ^{14}C detection with a hydrocarbon reaction cell that both dissociates mass 14 molecules and converts positive-ions negative to reject the ^{14}N isobar. This reversal of the usual AMS ion charging scheme eliminates the need for a particle accelerator and renders the new technique inherently more compatible with established sample speciation and preparation automation.

A new PIMS instrument at SUERC, that is also the prototype for commercial spectrometers to follow, is equipped with an electron cyclotron resonance ion source producing large C^+ beams from convenient gas samples. The spectrometer is for diverse experimentation in tracer and natural-abundance radiocarbon science.

PIMS performance and implications for radiocarbon metrology will be discussed.

[1] Freeman *et al*. (2015) *Nucl. Instr. Meth. B* **361** 229–232.