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## **Experimental design for beam motion measurements in the Crocker Nuclear Laboratory cyclotron at UC Davis**

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Older cyclotrons still find a variety of applications in research and education, but in many cases the beam dynamics of these machines is not well understood, which can be a limitation to achieving their ultimate performance.

The cyclotron at the Crocker Nuclear Laboratory at UC Davis is capable of accelerating protons, deuterons, or alpha particles to variable energies up to a maximum of 67 MeV for protons. Recently, we have been trying to improve the performance of the machine for a variety of applications, with particular emphasis on increasing the alpha beam, for use in producing the isotope  $^{211}\text{At}$ , which has great promise for cancer treatment. This effort is hampered by the lack of an accurate model of the cyclotron and extremely limited instrumentation for the beam as it accelerates.

This poster describes a series of beam measurements made using a segmented beam probe with the time resolution to measure individual bunch structures and sufficient lateral segmentation to measure horizontal and vertical motion of the beam as it accelerates. These are compared with models to try to understand such motion at a fundamental level.

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### **Footnotes**

### **I have read and accept the Privacy Policy Statement**

Yes

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