Abstract Submitted
for the NWS06 Meeting of
The American Physical Society

The Evergreen State College Cyclotron Project PAUL LESSARD, AMANDEEP DHILLON, CHRISTOPHER SMALLS, The Evergreen State College — We have designed a multipurpose cyclotron device, which may be used in a range of experiments. We are building our device in stages. Our first stage is a FT-ICR spectrometer, which uses an array of induction coils to monitor orbits in the chamber. Applying Fourier transform to the signal from this array will yield the cyclotron frequencies of all species orbiting in the chamber. From these frequencies, and their corresponding amplitudes, we can determine the charge to mass ratio, and relative abundance of species in our sample. This type of spectroscopy can distinguish between species of extremely similar mass. We will use the radio isotopic dating ladder, which requires higher and higher accuracies, beginning with carbon 14 dating, as a yardstick of our Success. During stage two we will install an exit port for an accelerated particle beam. We have designed a new beam extraction method that may better suit our particular application than the standard methods. At this stage we will use the signal coming from the induction array to determine the frequency at which we switch the potential across the gap. This allows us to synchronize the accelerating voltage and the particles orbit in such a way that we can effectively accelerate particles even when moving at relativistic speeds.

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Date submitted: 28 Apr 2006 Electronic form version 1.4