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Simulating the FTICR-MS signal of a decaying ^{7}Be Ion Plasma using a 2D PIC code M. TAKESHI NAKATA, GRANT W. HART, Brigham Young University, BRYAN G. PETERSON, ROSS L. SPENCER, Brigham Young University — Beryllium-7 (^{7}Be) decays only by electron capture into lithium-7 (^{7}Li) with a half life of 53 days. As a result, its decay rate varies with its environment. We desire to study the effect of ionization on its decay rate. We will do this by trapping a ^{7}Be ion plasma in a cylindrical Malmberg-Penning trap and measuring its and ^{7}Li's concentration as a function of time by using Fourier transform ion cyclotron resonance mass spectrometry (FTICR-MS). We use this ratio as a function of time to directly measure the decay rate of the confined ion plasma rather than using gamma detection. We have simulated these signals in a 2-dimensional electrostatic particle-in-cell (PIC) code. The two spectrum peaks merge at high densities and at low densities they can be resolved. The merged peak linearly shifts with the relative abundances of these species. We have also simulated singly-ionized beryllium-7 hydride (^{7}BeH$^+$) and ^{7}Li ion plasmas at high densities. These two separate peaks shift according to their relative abundances. We have developed an analytical model that explains how these peaks shift with their relative abundances.

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