Contribution ID: **24**

Type: **not specified**

Penning trap measurement of the mass of 32Ar

Considering that isospin is a good symmetry, broken mainly by electromagnetic effects, E. P. Wigner introduced the isobaric mass multiplet equation (IMME) to describe how the masses of isobaric analog states (IAS) of a given multiplet vary with isospin projection (i.e. difference between proton and neutron numbers). For a set of IAS with the same mass number A, total isospin T, but different Tz, the IMME simply states that $M(A,T,Tz)=a+bTz+cTz^2$ where Tz=A/2-Z. This remarkably simple formula holds very well throughout the nuclear chart but however fails in a few specific cases including the A=32, T=2 quintet. This has been extensively studied both experimentally and theoretically and it is commonly accepted that the breakdown of the IMME comes from isospin mixing of the T=2 states with nearby T=1 states. Some discrepancies nonetheless remain between different calculations and better experimental inputs are thus still useful. The ground state of 32Ar being the less precisely known member of the quintet with a 1.8 keV uncertainty is the primary objective of this LoI. We aim at reducing that uncertainty by a factor 5 to 10. The second lesser-known member of the quintet is 32Cl which is also abundantly produced at SPIRAL1. Even though the precision on its mass is already quite good (600 eV), it could still be improved with the PI-ICR technique available at PIPERADE. The same applies to the third lesser-known member, 32Si that will be accessible through in-trap decay if beams of 32Al or 32Mg are available by the time when the experiment is performed.

Author: GERBAUX, Mathias (LP2iB - Université de Bordeaux)