${}^{3}_{\Lambda}$H LIFETIME: AN OPEN ISSUE IN HYPERNUCLEAR PHYSICS

Elena Botta[1]
[1] Istituto Nazionale di Fisica Nucleare, Sezione di Torino and Universita' di Torino, Dipartimento di Fisica, Torino, Italy

The actual value of the hypertriton ${}^{3}_{\Lambda}$H lifetime is an open issue in Hypernuclear Physics.

The hypertriton is the lowest mass Λ-hypernucleus and the Λ hyperon binding energy is ~0.13 MeV only. This leads to expect a substantial equality between its lifetime and the free Λ lifetime, following the intuitive hypothesis that the constituent Λ would spend most of its time far from the deuteron core. Several theoretical calculations support such a hypothesis.

In the 60's and 70's many measurements of ${}^{3}_{\Lambda}$H lifetime have been performed by means of visualizing techniques. The results spread over an interval of values between ~90 ps and ~340 ps and are affected by large errors due mainly to reduced statistics. No firm conclusion on the expected equality could be drawn.

Recently new determinations were obtained in experiments studying central ultrarelativistic Heavy Ions collisions at BNL and CERN and relativistic ion fragmentation at GSI. The values reported agree and are significantly lower than the free lifetime, although still affected by sizeable errors. The interest in the experimental value of ${}^{3}_{\Lambda}$H lifetime has thus grown again.

For this reason a Letter of Intent for a high precision measurement has been recently put forward at the new J-PARC hadron facility. The idea is to exploit for the first time the (π^-, K^0) reaction to produce ${}^{3}_{\Lambda}$H on a liquid ^{3}He target and to use the delay time technique to obtain a final value of the lifetime. The details of the measurement are presented.