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Model the N+ emission in the Milky Way

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Context : Stars are formed in the neutral regions of a Galaxy. However, in the Milky Way, the neutral and ionised regions represent almost the same volume. To have a better understanding of the star formation, we then need to understand which phenomena are responsible of the ionisation in the Milky Way. The common view is that the star radiation is the phenomenon which creates ionized regions. But recent observations led by P.Goldsmith showed that the N+ (which is a tracer of fully ionized regions) distribution in the Milky Way can't be explained only with the star radiation.

Aims : My goal is to see to what extent the supernova remnants could reproduce the measured quantity of N+ in the Milky Way.

Methods : To do so, I have first modeled the galactic distribution of supernova. Then I used the Paris-Durham shock code to model the N+formation during the propagation of high velocity (30 to 400km/s) shocks in diffuse mediums (0.01 to 100 particles/cm3).

Results : Combining these two modelisations, I was able to estimate the N+ abundance in the Milky Way. My modelisation is at the moment able to reproduce between 10% and 50% of the observed N+.

Conclusions : This work, which is still ongoing, shows that the ionisation in the Milky isn't due to a single phenomenon but is probably a mix of -at least - the radiation emitted by stars and the kinetic energy at the end of their lifes.

Astrophysics Field

Interstellar Medium - Modeling - Supernova

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