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The role of electron capture decay in the precision era of Galactic cosmic-ray data

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Electron capture (EC) decay relies on attachment and stripping cross-sections, that in turn, depend on the atomic number of the nucleus. We revisit the impact of EC decay in the context of the high-precision cosmic-ray fluxes measured by the AMS-02 experiment. We derive the solution of the steady-state fluxes in a 1D thin disk model including EC decay. We compare our results with relevant elemental and isotopic fluxes and evaluate the impact of this process, given the precision of recent AMS-02, ACE-CRIS, SuperTIGER, and Voyager data. We find this impact to be at the level or larger than the precision of recently collected data for several species, e.g. ^{31}Ga and ^{33}As , indicating that EC decay must be properly taken into account in the calculation.

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