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Average Inhomogeneities in Milky Way SNII and The PAMELA Anomaly

James Stockton

(Submitted on 8 Jul 2011)

A model is presented to estimate the fraction of Supernova Type-II events (SNII) occurring inside vs. outside a spiral arm for a given star formation episode. The probability distribution function (PDF) for this fraction is given for use in models similar to those of Shaviv et al. [13][11]. The calculated PDF for the SNII fraction, $SNII_{in/total}$, defined as the number of SNII inside a spiral arm divided by the total number of SNII from a star formation event, provides a constraint on the magnitude of supernova remnant (SNR) concentrations used in cosmic ray propagation models attempting to explain the PAMELA anomaly. Despite the concentration of star formation within spiral arms, this model predicts the majority of SNII events actually occur in inter-arm regions and calls into question the SNR concentration assumption of Shaviv et al.

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