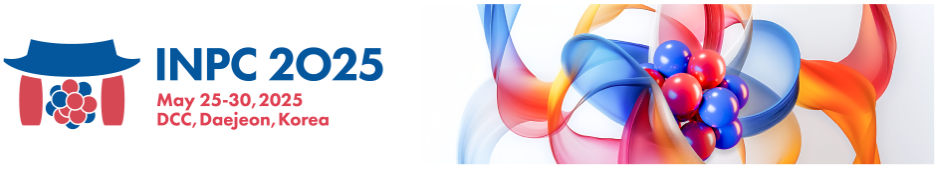

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Systematic Investigations of Scandium and Vanadium in Galactic Chemical Evolution

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Scandium and vanadium are primarily synthesized in core-collapse supernovae, but significant discrepancies remain between observational abundance ratios ([Sc/Fe], [V/Fe]) and predictions from Galactic Chemical Evolution (GCE) models. These discrepancies highlight gaps in our understanding of the production mechanisms for these elements. Neutrino interactions and jet-like explosions have been proposed as potential solutions for enhancing scandium and vanadium yields, though these processes have yet to be fully integrated into GCE models.

Recent studies have suggested additional mechanisms: stellar rotation and O-C shell mergers during hydrostatic burning can enhance scandium production, while vanadium abundances may be influenced by the SNIa yields, particularly in high-metallicity environments.

We present a systematic investigation of scandium and vanadium abundances using initial rotational velocity and the initial mass function as key parameters. The code was validated against well-established element abundances in the Milky Way, ensuring its reliability for investigating alternative yields and scenarios for the target elements.

By incorporating these factors into a refined GCE framework, we address the discrepancies and improve the predictive power of theoretical models for these critical iron-peak elements.

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