

Ia 超新星：理论与宇宙学

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摘 要

Ia 超新星作为测量遥远星系距离 (从而测定宇宙膨胀速率) 的“标准烛光”, 已经成为具有重要意义天体。主要介绍当前 Ia 超新星研究的理论和观测进展。光谱分光及测光证据表明, Ia 超新星是由吸积碳氧白矮星热核爆炸产生, 但有关 Ia 超新星前身星双星系统及流体动力学模型仍是有争议的。蓝 Ia 超新星具有相对均匀的峰值光度, 它是天文学家已知的校准得最好的示距天体。近年来, 人们在利用 Ia 超新星测量时空方面已取得了巨大进展。

关键词 观测宇宙学 — 距离标度 — 超新星 — 前身星

分类号 P145.3

Supernovae of Type Ia: Theory and Cosmology

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Abstract

Supernovae of Type Ia (SNe Ia) are becoming more significant objects, which can be used as a standard candle to measure distances to remote galaxies—and hence to determine the expansion rate of the universe. The progress on theoretical and observational studies of SNe Ia has been reviewed. Spectroscopical and photometric evidence indicates that SNe Ia originate from the thermonuclear explosion caused by accreting carbon-oxygen white dwarfs. However, the progenitor systems and the hydrodynamical models are still controversial. The peak luminosities of bluer SNe Ia are relatively homogeneous, which can be calibrated to be the best distance indicators beyond the Virgo Cluster. In recent years, much progress has been made in measuring the space-time.

Key words observational cosmology—distance scale—supernovae—progenitors