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Thesis Title	*Hadronic Models in Compact Astrophysical Objects*
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Summary	In recent years, some theories that describe the acceleration of particles in an astrophysical source have been developed, so as to understand better the origin of the non-thermal radiation and the physics that governs these sources. One such model is the hadronic, which suggests that the population that plays a major role in the emission of radiation is a population consisting mainly of protons. In this paper we present some basic applications of this model in various astrophysical sources with emphasis on type IIn Supernova explosions. These explosions have been discovered recently and they seem to occur in environments with very high numerical density of the order of 10^{7} - 10^{12} cm ^{3}. The proton { proton collisions is this physical process which could prove the existence of relativistic protons within these particular sources. These collisions produce charged and neutral pions which in turn decay into electrons, neutrinos and highly energetic rays through the relationships $\pi \rightarrow \mu + \nu_\mu$, $\mu \rightarrow e + \nu_e + \nu_\mu$ and $\pi^0 \rightarrow 2$ respectively. Nevertheless, some new improved theories are needed that can describe and predict the behavior of these particular astrophysical phenomena. One way to achieve this is through the use of the diffusion-loss equation, which may describe the time evolution of a population of relativistic particles taking into account the various physical processes occurring within the source. In this paper we present the analytical solution of such an equation for various simplified applications and the conclusions arising from the numerical approach considering the case of a type IIn Supernova.
Key words	High Energy Astrophysics, hadronic model, proton-proton collisions, diffusion -loss equation, type IIn Supernovae
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