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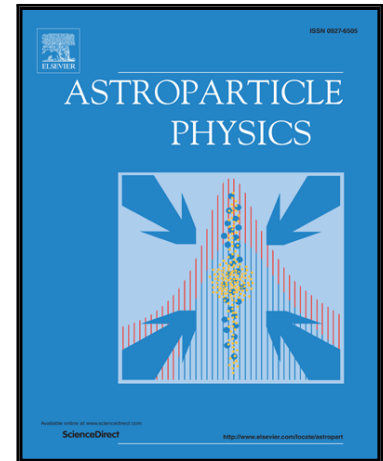
Zeinab Rezaei

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# Neutron stars with spin polarized self-interacting dark matter

Zeinab Rezaei<sup>1</sup>

*Department of Physics, Shiraz University, Shiraz 71454, Iran*

*Biruni Observatory, Shiraz University, Shiraz 71454, Iran*

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## Abstract

Dark matter, one of the important portion of the universe, could affect the visible matter in neutron stars. An important physical feature of dark matter is due to the spin of dark matter particles. Here, applying the piecewise polytropic equation of state for the neutron star matter and the equation of state of spin polarized self-interacting dark matter, we investigate the structure of neutron stars which are influenced by the spin polarized self-interacting dark matter. The behavior of the neutron star matter and dark matter portions for the stars with different values of the interaction between dark matter particles and spin polarization of dark matter is considered. In addition, we present the value of the gravitational redshift of these stars in different cases of spin polarized and self-interacting dark matter.

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*Key words:* Neutron stars; Dark matter; Spin polarization

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## 1 Introduction

Because of the compactness and high density of compact objects, the accretion of dark matter (DM) particles can take place on compact stars [1,2]. The compact objects are sensitive probes of DM and they set constraints on the properties of DM particles and its density [1]. It has been shown that the heating due to the accretion of WIMPs onto cool white dwarf stars could be detected [1]. Self-annihilating neutralino WIMP DM accreted onto neutron stars results in a mechanism to seed compact objects with long-lived lumps of

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<sup>1</sup> zrezaei@shirazu.ac.ir

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