

DECLARATION

I declare that the thesis entitled "DARK MATTER MODELS & STRUCTURE FORMATION" is a record of original research work undertaken by me for the award of the degree of Doctor of Philosophy in Physics under the supervision of **Prof. Prashant. K. Mehta**, Department of Physics, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, and Co-supervision of **Prof. Jitesh. R. Bhatt**, Theoretical Physics Division, Physical Research Laboratory, Ahmedabad, and has not formed the basis for the award of any degree, diploma, associateship, fellowship, or titles.

I hereby confirm the originality of the work and there is no plagiarism in any part of the thesis.

Signature: _____

April 2025

CERTIFICATE

This is to certify that the thesis submitted by **Purohit Kuldeep Jagdishkumar**, entitled "**DARK MATTER MODELS & STRUCTURE FORMATION**" in fulfillment for the award of Doctor of Philosophy in Physics is a record of original research work carried out by him during the academic year 2020 to 2025 under our supervision.

This thesis has not formed the basis for the award of any degree, diploma, associate-ship, fellowship, or titles. We hereby confirm the originality of the work and there is no plagiarism in any part of the thesis.

Supervisor: _____

Co-Supervisor: _____

April 2025

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List of Publications

1. KULDEEP J. PUROHIT, PRAVIN KUMAR NATWARIYA, JITESH R. BHATT, AND PRASHANT K. MEHTA. Formation of a Bose star in a rotating cloud. *Astrophys. Space Sci.*, 368(11):97, 2023.
2. KULDEEP J. PUROHIT, JITESH R. BHATT, SUBHENDRA MOHANTY AND PRASHANT K. MEHTA. Axion Star Decay in Galactic Magnetic Field [Manuscript under preparation]

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