

## SPHERICALLY SYMMETRIC ANISOTROPIC PERFECT FLUID BALL IN GENERAL RELATIVITY

A. Sah<sup>1</sup>, Prakash Chandra<sup>1</sup> and Kali Charan<sup>2</sup>

<sup>1</sup>Department of Mathematics,  
Kumaun University, MBGPG College, Haldwani, India.  
E-mail: pcfsouk@gmail.com, archanasah7@gmail.com,

<sup>2</sup>Department of Mathematics,  
Kumaun University, Govt. PG College Dwarahat, Almora, India.  
E-mail: kcyadav2008@gmail.com

*Dedicated to Prof. A.M. Mathai on his 80<sup>th</sup> birth anniversary*

**Abstract:** In this investigation of a spherically symmetric shear free anisotropic fluid we present a new model of the general relativistic field equations by using Tewari and Charan [1] solution as a seed solution. The solution is having positive finite central pressures and central density. The ratio of pressures and density is less than one and casualty condition is obeyed at the centre. Further, the outmarch of pressures, density and pressure-density ratio, and the ratio of sound speed to light is monotonically decreasing. The central red shift and surface red shift are positive and monotonically decreasing. Further by assuming the suitable surface density, we have constructed a compact star model with all degree of suitability.

**Keywords:** Exact solutions, Einsteins field equations, Perfect fluid ball, Compact star, General relativity.

### 1. Introduction

A compact stellar object is formed by an equilibrium state which is reached after condensation and contraction of a massive gas cloud. At this state thermal radiation pressure together with normal fluid pressure balances the gravitational binding energy. Various studies are made for understanding the formation of compact star, its physical properties and internal structure by the solution of Einstein's field equation. Therefore the static isotropic and anisotropic exact solution which describes the compact star is caused to enthusiasts the Researchers to conduct the work in the same field. The study of interior of massive fluid ball can be made by