MAGNETO-HYDROSTATIC STARSPOTS OF LATE TYPE STARS

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We examined the characteristics of starspots based on magneto-hydrostatic equilibrium models. In constructing the models, we made use of the analogy between starspots and sunspots.
It is found that large starspots which cover a few percent of the whole stellar surface could have a field strength of 1000~3000 gauss.

Numerical Method for Non-LTE Problems

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Difference method proposed by Feautrier is one of the most useful tools for the solution of the two points boundary problems, having the advantage of easy programming, speed and flexibility. The Feautrier method can be applied to non-LTE model atmosphere, using the complete linearization technique developed by Auer and Mihalas. This technique is a kind of Newton-Raphson method which has a power to linearize simply the non-linear system. It is however necessary to calculate the first derivative of the equation to use this method. Therefore, for the case of our non-LTE problem, we must compute the first derivatives of simultaneous equations of radiative transfer, statistical equilibrium and charge-particle conservation. This work is very complex and troublesome process required much time and cares. In this paper, we will report the result of our calculation obtained by using secant-like method instead of Newton-Raphson method. Our method save much programming process and can be used to make a general library for the solution of the simultaneous non-linear equations.

Radial Stability of the Spherical Accretion Flow

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Time-dependent general relativistic radiation hydrodynamic equations for the spherical flow around compact objects are derived. Covariant tensor formalism is used with tensor conservation equations. The equations contain terms in both comoving and fixed frames. The equations are simpler but shown to be equivalent to the more complicated approaches. They are subsequently linearized for the small perturbations in spherical accretion flow, dominated by the outcoming radiation field. Dispersion relations for the possible modes are obtained. The preliminary analyses show that the radiation-dominated spherical flows seem stable under radial perturbations. The local modes found are comoving sound waves and internal modes which do not grow and diffusion mode which decays in collisional time