

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 outgoing 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

scales. This work will be extended to stability against global modes and non-radial modes.

NGC 2071 반사성운과 관련된 분자흐름

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활발한 별형성영역에 대한 지금까지의 밀리미터파 분자선관측에 의하면, 별형성의 어느 특정 시기에는 분자흐름이 생긴다는 것이 관측적으로 밝혀지고 있다. 현재 이러한 분자흐름의 형성 과정과 가속기구 등에 대해서 많은 연구가 행해지고 있다. 이와 같은 복잡한 계에 대한 문제의 해결을 위해서는 보다 많은 천체들에 대한 통계적인 연구가 필요하다.

우리는 대덕전파망원경을 사용하여 1992년 3월~5월에 NGC2071 반사성운에 대한 분자흐름을 관측하였다. 사용한 분자선은 ^{12}CO J=1-0와 ^{13}CO J=1-0, C^{18}O J=1-0 및 CS J=2-1의 회전 천이선들이다.

^{12}CO 분자선의 line profile은 양쪽에 날개구조를가지고 있으며, 북동방향에서는 청색편이, 남서방향에서는 적색편이된 분자흐름이 각각 두드러지게 나타나고 있다. 한편 ^{13}CO 분자선에서도 날개성분을 보이고 있다. ^{12}CO 의 line profile의 중심속도 부근에서는 강한 흡수가 나타나고 있다. 따라서 LTE방법을 통한 물리량(시선밀도, 적색편이 및 청색편이된 분자흐름의 질량 등)의 계산결과에 대하여 보고하고자 한다.

Formaldehyde in Molecular Cloud, B5

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Barnard 5 is a cloud associated with an extended dust lane in Perseus, northeast of the NGC 1333 nebula at a distance of about 350pc. B5 has four infrared sources, and at least one of them is currently forming star in the region. Especially, B5 contains the five dense clumps to be identified with C^{18}O and ^{13}CO map. These clumps are related with the infrared sources.

We observed the Barnard 5 with H_2CO 6cm line at Max-Planck Institute in August, 1991. We compared CO, NH_3 and CS with H_2CO molecule line which we obtained. The distributions of molecules in the cloud show a good coincidence with each other. We derived correlation T_a and integrated T_a of H_2CO to visual extinction. Due to the linewidth variation of the H_2CO , systematic structure is more clearly seen in peak temperature maps than in the integrated intensity.

Measurement of Methyl Cyanide E/A Ratio in TMC-1

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