fields parallel to the disk, and gravitational fields originated from a point mass is more unstable to the antisymmetric (odd mode) pertyrbation with respect to the midplane of the disk than the symmetric (even mode) one (Horiuchi et al. 1988). By applying symmetric and antisymmetric perturbations with unstable pairs of horizontal and vertical wavelengths to the initial states, we obtained the final equilibrium states of the Parker instability in the system.

Comparing the final equilibrium states with and odd modes, we found that i)the column density of the odd mode is greater than that of the even mode at the position of magnetic field "valleys", ii)the total magnetic and total gravitational energy of the odd mode are smaller than those of the even mode. For the case of the odd mode, the ratio of magnetic pressure to gas pressure at the position of valleys is less than 0.1 and the direction of the magnetic fields is nearly vertical to the disk. This result demonstrates that Parker instability can generate weak vertical magnetic fields at the position of valleys which are indispensible to the magnetorotational instability(balbus & Hawley 1991).

A Survey of ^{30}SiO Emission From Evolved Stsrs

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We present the first detection of ^{30}SiO v=1, J=1-0 maser emssion toward the Mira variable star TX Cam among 18 surveyd evolved stars. The line width and intensity of this maser were much narrower and weaker than those of ^{30}SiO v=0, J=1-0, providing the fact that it is unsaturated. The result also implies the fact we can not directly adopt the line overlap mechanism for the ^{30}SiO masrs of TX Cam without testing the normal inersion mechanism. The ^{30}SiO v=0, J=1-0 and ^{30}SiO v=0, J=2-1 emission lines have been also newly detected in 6 evolved stars: TX Cam, R Cas, χ Cyg, W Hya, U Lyn, and WX Psc. They show a different masing status of ^{30}SiO depending both each source and transition, probably related to a critical masing condition.

On the Polarization of Resonantly Scattered Lines in the Quasar Broad Absortion Line Troughs

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The contribution to the expected linear polarization in the quasar broad absorption line troughs from resonance scattering is computed using a Monte Carlo approach

for specific, generic models. Broad absorptin line quasar, which comprise about 10 percent of radio-quiet quasar, show deep absorption troughs in their highly ionized permitted lines. The broad absortion lines are associated with outflowing gas outside the broad emission line region. The polarization of both the transmitted and the reflected radiation is computed for simple kinematic models of the outflow and the observed intergrated polarization in the absorption line throughs is found to be typically ~10 percent. An equatorial flow model gives a large degree of polarization (~0.15) parallel to the symmetry axis in the absorption through for the doublet transition J=1/2→1/2 3/2 and the polarization (~0.05) perpendicular to the jet axis from a bipolar flow model and the polarized flux is concentrated to the blue side of line profile. Polarization observation of quasar emission lines promise to be a powerful diagnostic of the kinematics of gas in the central pc of a quasar.

Is The Bulge of a Barred Galaxy NGC 936 Triaxial?

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We have examined bulge morphology of an early type barred galaxy NGC936, using V-band surace photometry based on the Kiso Schmidt plates, together with R and I-band images taken with the FORD CCD attached on the DAO 1.8m telescope. Triaxiality in bulge of disk galaxies is one of the main issues of morphology and dynamics of galaxies. Photometrically, triaxial bulges can be identified by the isophotal twists and/or misalignment between bulge and disk major axes (Stark 1977). Komendy (1982) suggested that triaxial bulge are preferentially occured in barred galaxies, owing to their dynamical interactions with the prominant bars. Bertola et al. (1991) reported that triaxial bulges are not rare in nearby non-barred galaxies from photometry alone, due to triaxial bars. The bulge of NGC936 was thought to be triaxial by Bertola et al. (1989), but Kent(1989) suggested an oblate spheroid. Our preliminary analysis of the Kiso plates, by means of an ellipse fitting and a new two-dimensional profile decomposition technique, supports the assumption of the oblate spheroid. We will discuss the results of a detailed analysis of the bulge morphology of NGC936 from new CCD observations.

Contributions to the Cosmic Ray Flux Near 10^{19} eV: Cluster of Galaxies

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Cosmological numerical simulation have shown that the accretion shocks form around the clusters of galaxies due to continous infall of surrounding medium toward the center of ghe cluster gravotational potential well. It has been suggested (Kang et