those of lenses. The above results may be intepreted by the hypothesis of secular evolution in the barred galaxies.

Collimation Mechanism of Optical Jet Inside the Bipolar Molecular Outflows: Evaporation Effect

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An evaporation disk model is proposed to figure out shapes of molecular disks with density distributions of $\sigma_d \propto r^{-n}(n>1.8)$ using the energy and pressure equilibrium conditions as well as to explain to collimation mechanism of optical and radio jets with an openning angle of about $10°$ inside bipolar molecular outflows.

Numerical hydrodynamic calculation of the jet inside shows that the jet velocity increases with a dependence on $Z^{1.5}$ and the Mach number of the jet converges to $\sqrt{3}$. Mechanical energy of the jet heats the jet material, increasing the jet temperature with a distance. Calculated $H\alpha$ flux in shock condition and radio continuum intensity at 5GHz are surely comparable to the observed ones. These results strongly support the evaporation disk model in collimating jet.

The Distribution of Dust Inside the Orion Nebula

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The spatial distribution of the volumetric scattering cross section of dust, $n(r)\sigma_{sca}(r;\lambda)$, and of the dust-to-gas ratio $n(r)_{sca}(r;\lambda)/n(r)_{gas}$ in the Orion nebula are derived from the observations of scattered continuum in the UV and visual wavelength region. Single scattering with the hemispherical geometry is assumed. The resulting distribution of dust-to-gas ratio shows that dust particles are depleted near the central star, thus there must be a cavity that contains little dust. The distribution of dust and their scattering characteristics will be briefly discussed.

The Predicted [H_2] Ro-Vibrational and [OI] 63.19μm Line Intensities From Interacting Clouds in Galaxies

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The purpose of this work is to determine the predicted intensities of atomic fine structure and H_2 emission from an ensemble of unresolved interacting clouds and then apply this to normal and interacting galaxies. Calculation of shock intensities for cloud collisions was performed for the case of no magnetic field or collisions along the magnetic field. In this calculation, I considered several cooling mechanisms and chemistry.

Calculation of the infrared [H_2] and [OI] 63.19μm line intensities from an individual cloud as a

function of shock velocities was presented. I discussed the predicted [H_2] and [OI] 63.19μm line intensities from a random distribution of interacting clouds in normal and interacting galaxies. A normal galaxies and M82 was considered as example. Especially I discussed the mechanism which produced the observed [OI] 63.19μm and [H_2] 2.122μm intensities from M82. I also discussed the predicted [H_2] in and [OI] intensities in galaxies, assuming a hierarchical cloud model. The ratio of the [H_2] 2.122μm to the Br_γ intensity from the HII regions and the cloud velocity distribution was derived.

The Acoustic Emission in a Sunspot

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An attempt has been made to generalize earlier works on the generation of acoustic waves in a non-magnetic turbulent medium by taking into account the effect of a strong vertical magnetic field. In our work, the horizontal component of turbulent magnetic field and the monopole term in the Reynolds stress have been taken to be principal sources, which produce the acoustic waves in sunspots.

The resulting formulation has been applied to a typical sunspot model (T_{eff}=4000°K, B=3200 gauss), which was constructed by means of Öpik's convection theory on the assumption that the missing flux in sunspots is transported away by undissipated Alfven waves. The computed energy spectrum of the acoustic waves emitted from the spot is presented and its physical characteristics are discussed.

구상성단의 형태학적 인자들로 부터의 물리량 추정

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구상성단의 C.M 도상에서 얻어지는 형태학적 인자들을 항성 진화 모형(Sweigart and Gross 1976; Ciardullo and Demarque 1977; VandenBerg and Bell 1985)과 대기 모형(Kurucz 1979; Bell and Gustaffson 1987; VandenBerg and Bell 1985)으로부터 이론적으로 도출하는 관계식들을 구하였다. 이들을 주계열까지 잘 관측된 구상성단들에 적용하여 각 구상성단의 헬륨의 양 · 나이 · 질량 · 표면온도 · 맥동 주기등의 여러가지 물리량을 도출했다. 이들 물리량과 관측치의 비교를 통하여 구상성단의 체계적인 진화양상을 조사한다.

DDO 측광인자들의 눈금 재조정

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밝은 별들의 *DDO* 측광자료(McClure and Forrester 1981, Publ. Dominion Ap. Obs., **15**, 439)에 *UBV* 측광자료(Hoffleit 1982, "The Bright Star Catalogue", Yale Univ. Obs)를 적용하므로써 *DDO* 색지수($C(42\sim45)$, $C(45\sim48)$)와 ($B-V$) 사이의 고유색지수 관계도표를 얻었다.

위의 관계도표로부터 성간소광이 보정된 *DDO* 측광인자($C(41\sim42)_0$, $C(42\sim45)_0$, $C(45\sim48)_0$)와