others, it is found that the UBV colors of galaxies (from ellipticals to irregulars) can be explained with exponentially decreasing star formation rates and bimodal initial mass functions.

Inflation and Generation of Primordial Black Holes

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The formation of primordial black holes in 'two scalar fields' model is investigated. The scalar field ϕ_1 is one of Linde's chaotic inflationary field and scalar field ϕ_2 is is the adjoint Higgs field of SU(5) grand unified theory with Coleman-Weinberg spontaneous symmetry breaking. It is assumed that inflation is driven by ϕ_1. It is shown that primordial black holes can be produced right after the critical temperature of ϕ_2 (i.e., $\approx 1.31\times10^{14}$ Gev). If the reheating temperature is 1.48×10^{14} Gev, black holes with $M\approx$1kg are formed and the total mass of the black holes produced then within 10cm, corresponding to today's horizon, is about 10^{55}g—the horizon mass of the present Universe.

The Effects of Initial Mass Function and Star Formation Rate on the Galactic Chemical Evolutions

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We investigated the effects of the Initial Mass Function (IMF) and Star Formation Rate (SFR) on the galactic chemical evolutions using numerical models based on the disk-halo two zone model of Lee and Ann(1981). In our models metal free intergalactic gas comes into halo and dilutes the halo metals, while the enriched gas from massive halo stars increases the disk metal abundance in the initial period of disk evolution. We also take into account the radial gas flow in the disk evolution. The models with time-dependent IMFs can solve the G-dwarf problem and agree with the observations in the solar neighborhood. The power law SFR (n=2) well describes the chemical history of the solar neighborhood, if there is no more stellar formation in the halo after the initial period of the halo formation.

The Development of a Cryogenic 40 GHz-Band Receiver

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We built a cryogenic receiver working at the frequency range 35 GHz~50 GHz for the cosmic radio observations for the first time in Korea.

A GaAs Schottky diode was employed for the biased cryogenic balanced mixer. We used the three stage HEMT amplifier for the first amplifications, which has a 400 MHz bandwidth at the center