depending on the geometry of the scattering medium rather than on the initial photon spectrum.

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Local and Global Oscillations in Radiation-Dominated Accretion Flows

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Many high luminosity low mass X-ray binaries exhibit Quasi-Periodic Oscillatory luminosity change. Three different behaviors of QPO found so far are classified as Horizontal Branch (HB), Normal Branch (NB), and Flairing Branch (FB). Beat frequency model is generally believe to provide the decent explanations for HB. However, there is no single universally accepted model for NB and FB. Only Lamb, Miller, and Fortner's radiation hydrodynamic model based on the numerical simulation has shown some hopes toward understanding these objects.

In this work, we lineraized the time-dependent radiation hydrodynamic equations and sought for the instabilities of the flow by using symbolic manipulation programs and numerical multiple shooting technique. Even after including general relativistic effects, the flow is stable to spherically symmetric perturbation, mainly due to the advection. But we found non-radial global modes have more interesting properties. The feedback between the production of radiation and the flow of gas controlled by the outcoming radiation generates mostly damped global modes, each of which is associated with a characteristic oscillation about the steady configuration. Under the conditions typical of low-mass X-ray binaries, some weakly damped modes exist and would be observable. These modes, especially when the luminosity of the system is close to the Eddington critical value, show some desirable properties QPO in these objects.

CCD Photometry of an Open Cluster NGC 7039

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A BVRI CCD-Photometry of the open cluster NGO7039 using data taken by 72 inch telescope at Dominian Astrophysical Observatory is presented. As the limiting magnitude of the CCD data is lower than that of photographic or photoelectric data, we were able to drive more accurate estimates of the distance modulus and age of the cluster. Our best estimate is $(m-M)_0$ = 10.3 (i.e. 1150 pc) which is larger than Schoneigh's estimate of 700pc. When