SUMARNA HAROON, National University of Sciences and Technology, Islamabad
The Effects of Running Gravitational Coupling On Rotating Black Holes

Motivated by the functional form of the gravitational coupling previously investigated in the context of infra-red limit of asymptotic safe gravity theory, I investigate the consequences of a running gravitational coupling for the properties of rotating black holes. Apart from the changes induced in the space-time structure of such black holes, there are also implications for the Penrose process and geodetic precession. In this approach, a new parameter $\tilde{\xi}$ is present in this solution, and I describe the Killing horizon, event horizon and singularity of the resultant metric. Particle geodesics, both null and timelike, are explored in the equatorial plane, and the effective potential is computed and graphically analyzed for different values $\tilde{\xi}$. The ergosphere increases as $\tilde{\xi}$ increases, and energy extraction via the Penrose process is described. For a given value of the spin parameter, the numerical results suggest that the efficiency of Penrose process is greater in asymptotically safe gravity than in the Kerr Black Hole. Finally a brief discussion on the Lense-Thirring frequency is also done.