Contribution ID: **146** Type: **Talk in a parallel session**

Distinguishing Signature of Kerr-MOG Black Hole and Naked Singularity via Lense-Thirring Effect

Monday, 8 July 2024 15:30 (20 minutes)

We examine the geometrical difference between non-extremal black hole(NXBH), extremal black hole(XBH) and naked singularity(NS) via Lense-Thirring(LT) effect in spinning modified-gravity(MOG). For NXBH, we find that the LT frequency (Ω_{LT}) is proportional to the angular-momentum($J = a\,calM$) parameter or spin parameter(a) i.e. $\Omega_{LT} \propto J$ or $\Omega_{LT} \propto a$[where $calM = M(1+\alpha)$ is ADM mass, α is MOG parameter and M is Komar mass] and is inversely proportional to the cubic value of radial parameter i.e. $\Omega_{LT} \propto \frac{1}{r^3}$.
For XBH ($a^2 = \frac{G_N^2 calM^2}{1+\alpha}$), we find LT frequency is proportional to the angular-momentum parameter i.e. $\Omega_{LT} \propto \frac{1}{\sqrt{1+\alpha}}$ and is inversely proportional to the cubic value of radial parameter i.e. $\Omega_{LT} \propto \frac{1}{r^3}$. While for NS, we find $\Omega_{LT} \propto \frac{calM^3}{J^3}$ and $\Omega_{LT} \propto \frac{\left[r-\left(\frac{\alpha}{1+\alpha}\right)\frac{G_N calM}{2}\right]}{\sqrt{1+\left(\frac{\alpha}{1+\alpha}\right)\frac{G_N^2 calM^2}{a^2}}}$ in the limit $\theta = 0$ and $a = \frac{J}{calM} >> r$. It depends both on the angular momentum parameter and MOG parameter~α.

Primary author: PRADHAN, PARTHA PRATIM (HIRALAL MAZUMDAR MEMORIAL COLLEGE FOR WOMEN)

Presenter: PRADHAN, PARTHA PRATIM (HIRALAL MAZUMDAR MEMORIAL COLLEGE FOR WOMEN)

Session Classification: Black holes in alternative theories of gravity

Track Classification: Black Holes: Classical and Beyond (BH): Black holes in alternative theories of gravity