

Geodesic Focusing Conditions in $f(Q)$ Gravity

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In this talk, I will discuss the focusing of timelike geodesic congruences in $f(Q)$ gravity. I will first introduce geodesic deviation in symmetric teleparallel geometry and the modified Raychaudhuri equation obtained under a Weyl-type nonmetricity ansatz and an additional nonmetricity–acceleration condition. I will then present a focusing condition expressed in terms of the matter energy-momentum trace and an effective trace, and discuss the compatibility of the ansatz with homogeneous and isotropic connections. Finally, I will consider a shear-free flat FLRW background in the compatible coincident-gauge sector, where the modified Friedmann equations yield $T_{\text{eff}} = T$ for $f_Q > 0$. Under these assumptions, the focusing inequality is saturated and imposes no additional constraint on the matter content.

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