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Light bending around a gravitating object immersed in a moving medium

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A well-known effect confirmed by astrophysical observations is the light deflection in the gravitational field. In the recent years, the Hamiltonian formalism has been frequently applied in analytical studies to discuss how a medium that surrounds the gravitating object changes the light bending compared to the absence of the medium. Within this formalism, the medium is usually regarded as a cold plasma. However, in a cold plasma the light motion is independent of the medium velocity. Correspondingly, any difference of a medium from the cold plasma model will manifest itself in the appearance of a deflection angle dependence on the medium velocity. In our recent work we considered that a more general medium surrounds a spherically symmetric object and analyzed the deflection angles. Two particular examples of the medium were discussed, i.e., the radially falling and rotating ones. Results obtained in these settings will be presented. Furthermore, I will discuss additional findings derived when an axially symmetric object in a moving medium was considered instead.

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