



Moments of hyper-Rayleigh spectra of selected rare gas mixtures

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In this work we have analyzed spectral moments characterizing properties of the collisionally hyper-Rayleigh scattered light. This is a supplementary study undertaken in order to complete the series of our previously published papers on the collisional hyper-Rayleigh scattering spectral profiles. In order to evaluate the moments we have extended the theory so that it could embrace the hyper polarizabilities of higher rank. Using the expressions developed on the grounds of the theoretical principles and applying appropriate computational methods with *ab initio* hyperpolarizability values as an input, we have obtained desirable moment values for three diatomic noble gas systems: HeNe, HeAr, and NeAr, at several temperature points. The semiclassical and the quantum treatments have been taken into account, and the moments were calculated both from the sum rule method as well as from the spectral profiles. The results were compared and discussed.

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