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Study of linear and non linear properties in lead-free double perovskite: Cs2 AgIn0,9Bi0,1Cl6

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The successive improvement of technologies across various fields, from communication to medicine, is substantially driven by the exploration of new materials and techniques in nonlinear optics (NLO). (1) Despite significant progress over the past few decades, NLO continues to present challenges and opportunities for further technological innovation. Among the materials that have gained prominence in this area are the semiconductors, particularly perovskites, which has shown great potential for applications in optoelectronic devices, including photovoltaics, photodetectors, and lasers. (2) Recently, their nonlinear properties have also been investigated, yielding promising results, mainly the lead-based halide perovskites, due to its chemical and electronic properties. (2) However, the development of lead-free perovskites has become essential, because of the high toxicity of lead, leading to the emergence of double perovskites, that shows higher stability and non toxic nature when compared to lead halide perovskites. (3) In this context, this project aims to study the linear and nonlinear optical properties of Cs2AgIn0,9Bi0,1Cl6 lead-free double perovskite doped with rare earths (Er3+and Eu3+). The focus is primarily on first-order hyperpolarizability (β), a key factor in the NLO properties, using the Hyper-Rayleigh scattering technique for spectral analysis. Additionally, complementary measurements, such as Raman spectroscopy, X-ray photoelectron spectroscopy (XPS), and X-ray diffraction (XRD), will be conducted to better understand the materials structure. These perovskites are expected to show favorable results, proving their potential as viable options for new technological applications.

Palavras-chave: Nonlinear optics; Hiper-Rayleigh Scattering; Perovskites.

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