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Bound-bound transitions in the emission spectra of Ba^{+}-He excimer

Moroshkin P., Kono K.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016 American Physical Society.We present an experimental and theoretical study of the emission and absorption spectra of the Ba+ ions and Ba+∗He excimer quasimolecules in the cryogenic Ba-He plasma. We observe several spectral features in the emission spectrum, which we assign to the electronic transitions between bound states of the excimer correlating to the 62P3/2 and 52D3/2,5/2 states of Ba+. The resulting Ba+(52DJ)He is a metastable electronically excited complex with orbital angular momentum L=2, thus expanding the family of known metal-helium quasimolecules. It might be suitable for high-resolution spectroscopic studies and for the search for new polyatomic exciplex structures.

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