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PENNING AND PHOTO IONIZATIONS OF COLD RYDBERG ALKALI-METAL ATOMS UNDER FÖSTER RESONANCE CONDITIONS

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Abstract. Cold Rydberg media under certain conditions quickly evolve into cold neutral plasma, which is accompanied by the appearance of various phenomena such as spontaneous plasma expansion, recombination of Rydberg atoms, etc. (see Lyon et al. 2017). In the physics of ultra-low-temperature plasma, in addition to traditional impact processes involving electrons and ions, one should take into account the ionization of Rydberg atoms due to thermal radiation and the Penning autoionization of Rydberg atomic pairs (see Abo et al.2020). We report our comprehensive studies, both numerical and analytical, of various aspects of photo- and Penning ionization of Rydberg atoms, highlighting the effects of the Förster resonance. The latter is used as a controlling mechanism for varying the long-range interatomic interaction (see Dimitrijević et al. 2019) and it has numerous applications in applied problems of Rydberg media (see Paris-Mandoki et al. 2019).

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