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Progress report

MODELLING OF MERCURY ISOTOPES SEGREGATION IN CP STELLAR ATMOSPHERES: RESULTS AND PROBLEMS

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An essential topic of our investigations during more than last decade has been study of evolutionary segregation of heavy metals and their isotopes due to light-induced drift (LID) in the atmospheres of HgMn stars. A Fortran 90 software SMART for modelling of stellar atmospheres, computation of stellar spectra and study of different physical processes in stellar atmospheres has been composed and used by us. It has turned out that formation of anomalous isotope abundances in stellar atmospheres, including the dominance of the heaviest isotope (we made computations for Hg), cannot be explained without including LID mechanism. To carry out LID computations for asymmetrical partly overlapping spectral line profiles, very high resolution computations and precise data on hyperfine and isotopic splitting of spectral lines and better cross-sections of different physical processes are needed. We report some results about the evolutionary scenario of segregation of mercury and its isotopes and discuss some problems on the way of further studies. The problems of LID modelling in these quiescent non-rotating CP star atmospheres involve the computation of line strengths, formation of line profiles due to different microphysical interaction processes, but also formation of microturbulence and weak stellar winds as the phenomena, reducing the LID. In addition, presence of entangled magnetic field can play definite role in the formation of anomalous isotope abundances, giving also Zeeman splitting of spectral lines.