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New RADIOM algorithm using inverse EOS[1] MICHEL BUSQUET, ARTEP, Inc & Resarch Support Instruments, IGOR SOKOLOV, University of Michigan, MARCEL KLAPISCH, ARTEP, Inc & Berkeley Research Associates —
The RADIOM model, [1-2], allows one to implement non-LTE atomic physics with a very low extra CPU cost. Although originally heuristic, RADIOM has been physically justified [3] and some accounting for auto-ionization has been included [2]. RADIOM defines an ionization temperature Tz derived from electronic density and actual electronic temperature *Te*. LTE databases are then queried for properties at *Tz* and NLTE values are derived from them. Some hydro-codes (like FAST at NRL, Ramis' MULTI, or the CRASH code at U.Mich) use inverse EOS starting from the total internal energy *Etot* and returning the temperature. In the NLTE case, inverse EOS requires to solve implicit relations between *Te*, *Tz*, <Z> and *Etot*. We shall describe these relations and an efficient solver successively implemented in some of our codes.

[1] M. Busquet, *Radiation dependent ionization model for laser-created plasmas*, Ph. Fluids B 5, 4191 (1993).
[2] M. Busquet, D. Colombant, M. Klapisch, D. Fyfe, J. Gardner. *Improvements to the RADIOM non-LTE model*, HEDP 5, 270 (2009).
[3] M.Busquet, *Onset of pseudo-thermal equilibrium within configurations and super-configurations*, JQSRT 99, 131 (2006)

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