Test problems for 2022 EUV code comparison

Howard Scott

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Problem 1 - Atomic kinetics of Sn

Last year:

- specified by $T_e = T_i$, ρ
- radiation field specified by T_r

T_e	10, 15, 20, 25, 30, 35, 40, 45, 50
ρ	0.0002, 0.002, 0.02
T_r	0, 20, 40

This year:

- specified by $T_e = T_i$, ρ
- $T_r = 0$
- Focus on effects of autoionization (AI) and dielectronic recombination (DR)
- Bandpass will remain at [13.15,13.85] nm

T_e	10, 15, 20, 25, 30, 35, 40, 45, 50
ρ	0.0002, 0.002, 0.02
AI / DR	1 (yes), 0 (no)

We will again use Yu. Ralchenko's database for displaying and comparing data

Problem 2 – matching experimental spectra

- Two spectra and experiment descriptions to be provided
  - case SnS1: EBIT spectrum
  - case SnS2: LPP spectrum
- The goal is to match the (normalized) experimental spectrum with a computed spectrum produced by a specified set of conditions
- The conditions / produced spectrum are not restricted to be uniform or optically thin (but are restricted to be steady-state). Feel free to invoke other physical processes (that cannot immediately be ruled out) to help match the spectrum.
- If multiple conditions are used, submit (at least) one representative set of conditions plus a listing of the multiple sets.
- Please submit a brief description of what assumptions were made

Problem 2 will be using the database for displaying and comparing data

Problem 3 – time-dependent laser absorption in Sn plasma

- Plasma specifications are the same as last year
- Time evolution includes inverse bremsstrahlung absorption and time-dependent atomic kinetics, and assumes $T_e = T_i$ at all times
- Other physics processes can now be included:
  thermal conduction [C], radiation transport [R], hydrodynamics[H]
- Requested options are:
  conduction + radiation transport S = CR
  conduction + radiation transport + hydrodynamics S = CRH

ID	TDL[S]1	TDL[S]2	TDL[S]3
λ	1.064 μm	1.88 μm	10.6 μm
ρ_0	0.03 g/cm^3	0.01 g/cm^3	0.0003 g/cm^3
X	10. μm	100. μm	1000. μm
P	5x10^{10} W/cm^2	5x10^{10} W/cm^2	10^{10} W/cm^2
Δt	0.4 ns	0.4 ns	4.0 ns

Additional information and questions

- Submission deadline for Problems 1, 2 : October 3
- Submission deadline for Problem 3 : October 10

Comments and Questions?