

## Collisional-radiative modeling for low temperature Ar, He, and H plasmas

### Content

Collisional-radiative (CR) modeling for low temperature Ar [1], He [2], and H plasmas was developed, which solves nonlinear steady-state balance equations including radiation trapping and heavy particle collisional ionization, and considers non-Maxwellian electron energy distribution function. The electron temperature and density diagnostics by the CR modeling and optical emission spectroscopy was compared with Langmuir probe measurements for the capacitively-coupled plasma, inductively-coupled plasma, and a novel applied-field MagnetoPlasmaDynamc (AF-MPD) thruster [3,4] devices in KAERI. The AF-MPD thruster device has been constructed and developed to generate high particle beams and heat fluxes relevant to divertor plasma which can be used for the plasma surface interaction study. The detailed population kinetics and spectra intensities by the CR modeling are presented and discussed.

### References

- [1] K.-B. Chai and D.-H. Kwon, *J. Quant. Spectrosc. Radiat. Transfer* 227 (2019) 136
- [2] K.-B. Chai and D.-H. Kwon, *Spectrochimica Acta Part B: Atomic Spectroscopy* 183 (2021) 106269
- [3] K.-B. Chai and D.-H. Kwon, *Plasma Physics and Controlled Fusion* 62 (2020) 035007
- [4] K.-B. Chai, D.-H. Kwon, and M. Lee, *Plasma Physics and Controlled Fusion* accepted.

**Primary authors:** KWON, Duck-Hee (Korea Atomic Energy Research Institute); Dr CHAI, Kil-Byoung (Korea Atomic Energy Research Institute)

**Presenter:** KWON, Duck-Hee (Korea Atomic Energy Research Institute)

Submitted by **KWON, Duck-Hee** on **Friday 22 October 2021**