**Model parameters for hot corona simulation**

- mars.input

Model particle (hot O/hot C) -> need to choose source reaction for hot C

Ionization ON/OFF -> should be OFF for hot C simulation/no ionization rate for C

Collision -> Collision type selection (hard sphere/differential scattering)

Thermalization criterion (Escape speed/local thermal speed)

Escaping particle criterion

- srcMars/BackgroundAtmosphere.cpp

Collision cross sections for differential scattering case

- srcMars/Mars.cpp

Ionization parameters (SemiMajorDistance, Photoionization rate, Ionopause altitude for different seasons & solar activities)

**Hot C Corona Simulation (used MTGCM: CO+, e-, O, CO2, Un, Vn, Wn, Ti, Tn, Te)**

🡪 Hot C paper 1

Figure 6-10: outputs of EL and EH cases

🡪 Hot C paper 2

Figure 6-15: outputs of EL/EH/PL/PH/AL cases

\*Switch available for turning on/off source reaction of hot C in “mars.input” (DR of CO+ / Photodissociation of CO)

\* For hot C cases (HotC\_DRofCOp\_EL):

Hot C corona for both source reaction (dissociative recombination of CO+ & photodissociation of CO) for equinox and solar low. For this version, the source reaction is dissociative recombination of CO+.

There is a switch for source reaction in input file.

This case corresponds to the figures for hot C paper I’s EL case (doi:10.1002/2013JE004552).

**Hot O Corona Simulation (used M-GITM: O2+, e-, CO2+, O, CO2, CO, N2, Un, Vn, Wn, Ti, Tn, Te)**

🡪 Hot O paper (JGR-planets)

- Figure 2-5: ionization OFF/domain size=6Rm/O-CO2=1.2E-18

- source of hot O: DR of O2+ only

🡪 Hot O-IUVS paper (GRL)

- All the model estimates for OI 1304 nm emission are for the PERMED case (perihelion and solar moderate)

- ionization OFF/domain size=6Rm/O-CO2=1.2E-18

- source of hot O: DR of O2+ & DR of CO2+

\*The SDC version of M-GITM has 3388.25 km as a radius of the planet (otherwise, 3396 km)