

# TH/P2-5 Frequency and Damping Rate of the Geodesic Acoustic Mode in Collisional Plasmas (Gao, Z)

**Five Collisional Operators** are employed and compared for the GAM:

- (a) Krook operator with number conservation only;
- (b) Krook operator with number and energy conservation;
- (c) Lorentz operator with a constant collision rate;
- (d) Lorentz operator with an energy-dependent collision rate;
- (e) Hirshman-Sigmar-Clarke collision operator

● **Collisional damping**

- non-monotonic behavior for all
- overestimated damping for (a)
- overestimated at low collisionality but underestimated at high collisionality for (c)
- close results for (b), (d) and (e)

● **GAM frequency**

$$\begin{array}{l}
 \sqrt{4/7 + \tau v_t/R} \\
 \text{(collisionless)}
 \end{array}
 \rightarrow
 \begin{array}{l}
 \sqrt{1 + \tau v_t/R} \quad \text{for (a)} \\
 \sqrt{5/3 + \tau v_t/R} \quad \text{for others}
 \end{array}$$

● **Energy conservation of the collision operator is important for GAM as well as number conservation**

