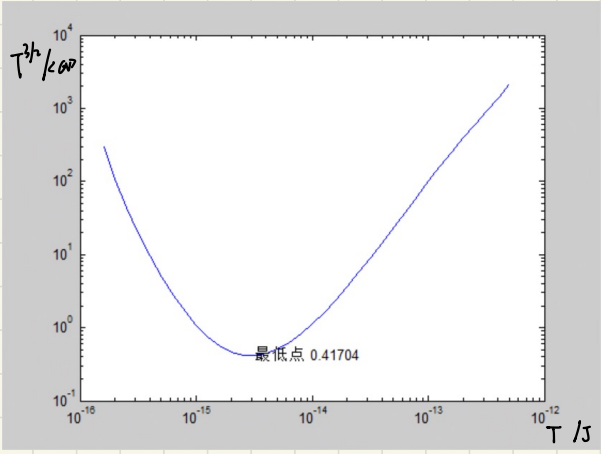
杨雨函 2020-11-19

$$n\tau_E \geq \frac{3T(1-\eta)}{\frac{1}{4}\langle\sigma v\rangle E_f \eta} \approx \frac{3T}{\frac{1}{4}\langle\sigma v\rangle E_f \eta}$$

$$n = \frac{\rho}{m}, \quad \tau_E = \frac{25\%\, r}{v_{th}}, \quad v_{th} = \sqrt{\frac{T}{m}}$$

$$\rightarrow \rho r \geq \frac{48 T m v_{th}}{\langle\sigma v\rangle E_f \cdot \eta} \approx \frac{1.1 \cdot T^{3/2}/\langle\sigma v\rangle}{\eta}$$

对 $T^{3/2}/\langle\sigma v\rangle$ 作图如下：



所以 $\rho r \geq 1.1 \cdot 0.41704/\eta \approx 0.46/\eta \ kg \cdot m^{-2}$.