



Time-stationary transport equation in spherical geometry:

$$\frac{\partial}{\partial r} \left[ r^2 D(r, p) \frac{\partial f}{\partial r} \right] - r^2 u(r) \frac{\partial f}{\partial r} + \frac{d[r^2 u]}{dr} \frac{p}{3} \frac{\partial f}{\partial p} + r^2 Q(r, p) = 0$$

- Arbitrary diffusion coefficient  $D(r, p)$

- Injection only at the termination shock

$$Q(r, p) \propto \delta(p - p_{\text{inj}}) \delta(r - R_s)$$

- Wind velocity profile:

$$u(r) = \begin{cases} u_1 = v_w & \text{for } r < R_s, \\ \frac{u_1}{\sigma} \left( \frac{R_s}{r} \right)^2 & \text{for } R_s < r < R_b, \\ 0 & \text{for } r > R_b; \end{cases}$$

**Boundary conditions:**

1. No net flux at the cluster center:  $r^2 [D \partial_r f - u f]_{r=R_c} = 0$
2. Matching the Galactic distribution:  $f(r \rightarrow \infty, p) = f_{\text{gal}}(p)$

