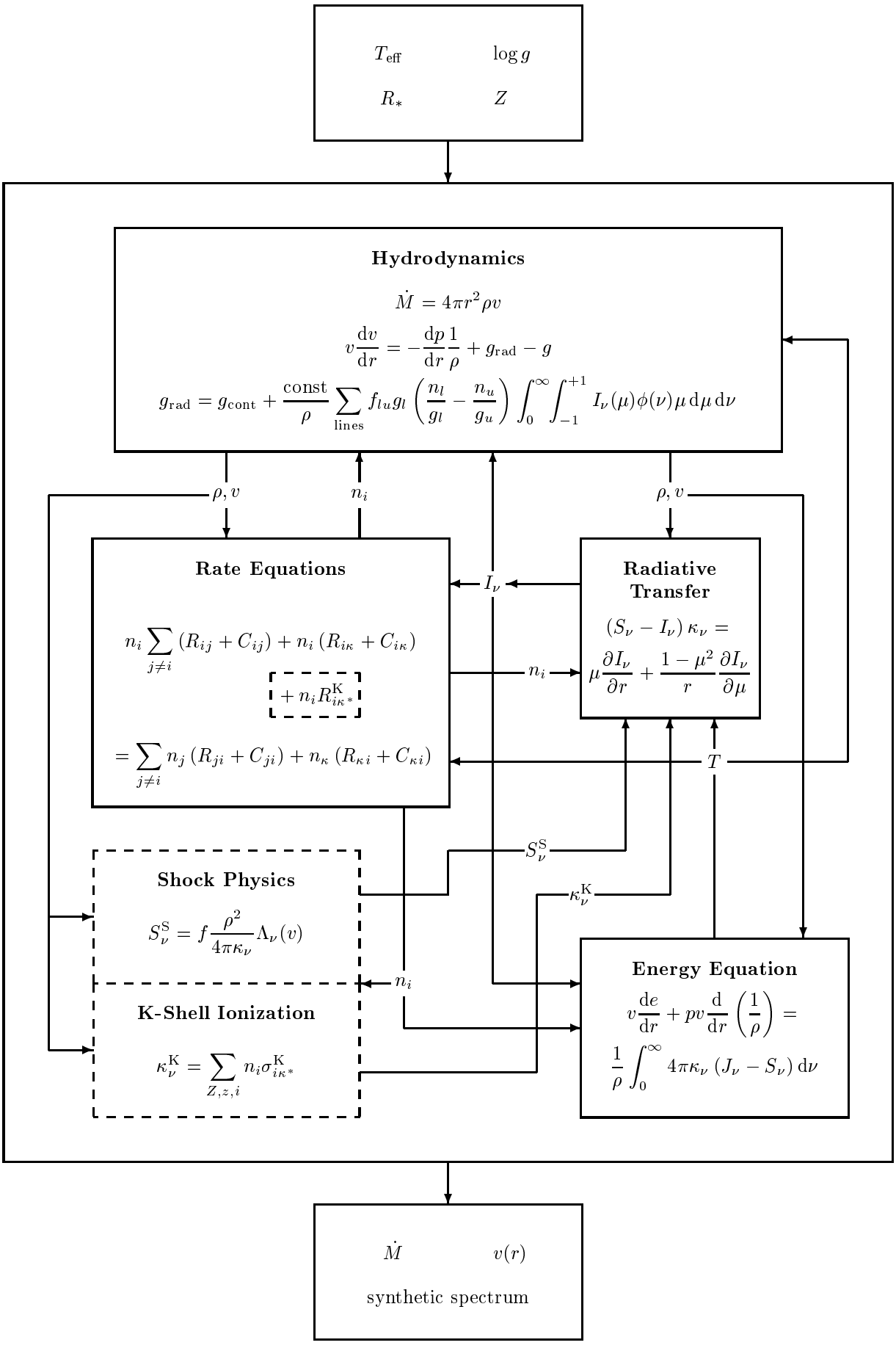
$T_{\rm eff}$ $\log g$
R_* Z
Hydrodynamics
$\dot{M} = 4\pi r^2 \rho v$
$v\frac{\mathrm{d}v}{\mathrm{d}r} = -\frac{\mathrm{d}p}{\mathrm{d}r}\frac{1}{\rho} + g_{\rm rad} - g$
$g_{\rm rad} = g_{\rm cont} + \frac{\rm const}{\rho}\sum_{\rm lines} f_{lu} g_l \left(\frac{n_l}{g_l} - \frac{n_u}{g_u}\right) \int_0^\infty \int_{-1}^{+1} I_\nu(\mu)\phi(\nu)\mu\,\mathrm{d}\mu\,\mathrm{d}\nu$
ρ, v
n_i
ρ, v
Rate Equations
$n_i \sum_{j\neq i} (R_{ij} + C_{ij}) + n_i (R_{i\kappa} + C_{i\kappa})$
$+ n_i R^{\rm K}_{i\kappa^*}$
$= \sum_{j\neq i} n_j (R_{ji} + C_{ji}) + n_\kappa (R_{\kappa i} + C_{\kappa i})$
I_ν
Radiative Transfer
$(S_\nu - I_\nu)\,\kappa_\nu =$
$\mu\frac{\partial I_\nu}{\partial r} + \frac{1-\mu^2}{r}\frac{\partial I_\nu}{\partial \mu}$
n_i
T
$S^{\rm S}_\nu$
$\kappa^{\rm K}_\nu$
Shock Physics
$S^{\rm S}_\nu = f\frac{\rho^2}{4\pi\kappa_\nu}\Lambda_\nu(v)$
K-Shell Ionization
$\kappa^{\rm K}_\nu = \sum_{Z,z,i} n_i \sigma^{\rm K}_{i\kappa^*}$
n_i
Energy Equation
$v\frac{\mathrm{d}e}{\mathrm{d}r} + pv\frac{\mathrm{d}}{\mathrm{d}r}\left(\frac{1}{\rho}\right) =$
$\frac{1}{\rho}\int_0^\infty 4\pi\kappa_\nu (J_\nu - S_\nu)\,\mathrm{d}\nu$
$\dot{M}$ $v(r)$
synthetic spectrum