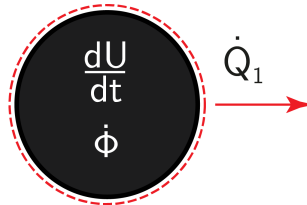


## EB - Rad. - Outer 11

Set up the outer energy balance for the sphere that describes the change of its homogeneous temperature  $T_1$  over the course of time. Use view factors and surface brightness whenever possible.



**Energy balance:**

$$\frac{\partial U}{\partial t} = \sum \dot{Q}_{\text{in}} - \sum \dot{Q}_{\text{out}}$$

$$\frac{dU}{dt} = \dot{\Phi} - \dot{Q}_1$$

**Change of internal energy over time:**

$$\frac{dU}{dt} = m_1 c_1 \frac{dT_1}{dt}$$

**Heat fluxes:**

Heat generated within the body:

$$\dot{\Phi} = \dot{\Phi}''' V_1$$

The surface brightness of body 1 will be determined in a separate task and can be stated as  $\dot{Q}_1$ .

**Substituting and rewriting:**

$$\Rightarrow m_1 c_1 \frac{dT_1}{dt} = \dot{\Phi}''' V_1 - \dot{Q}_1$$