Department of Astronomy & Astrophysics, University of Toronto

RADIATION PROCESSES – AST1440F

Review Questions for Section 9

1. What evidence do we have that hot stars are losing mass? What is the typical mass-loss rate for O stars?
2. How does the Castor wind mechanism work? What are the key factors? Why is the driving so efficient?
3. Why do weak lines contribute as much to the driving as strong lines at least in the limit where they are all optically thick?
4. By what factor (roughly) do the C III lines increase the radiation force above that of continuum electron scattering? How does the continuum radiation pressure compare with the gravitational force?
5. Why does the multiplier factor $M(\tau)$ get larger at smaller (continuum) optical depths?
6. Like most wind models, the Castor hot star wind solution is tangent to a singular surface. Why does this make numerical integrations difficult?
7. What forces are involved in the wind equation of motion?
8. What is the approximate terminal velocity of the wind for an Of star? Where is is subsonic? Supersonic?
9. What fraction of the momentum in the continuum radiation field is transferred to the wind in the O-star case? How can it be so large in view of the fact that the lines have less than 1% of the bandwidth of the continuum at any given level in the atmosphere?