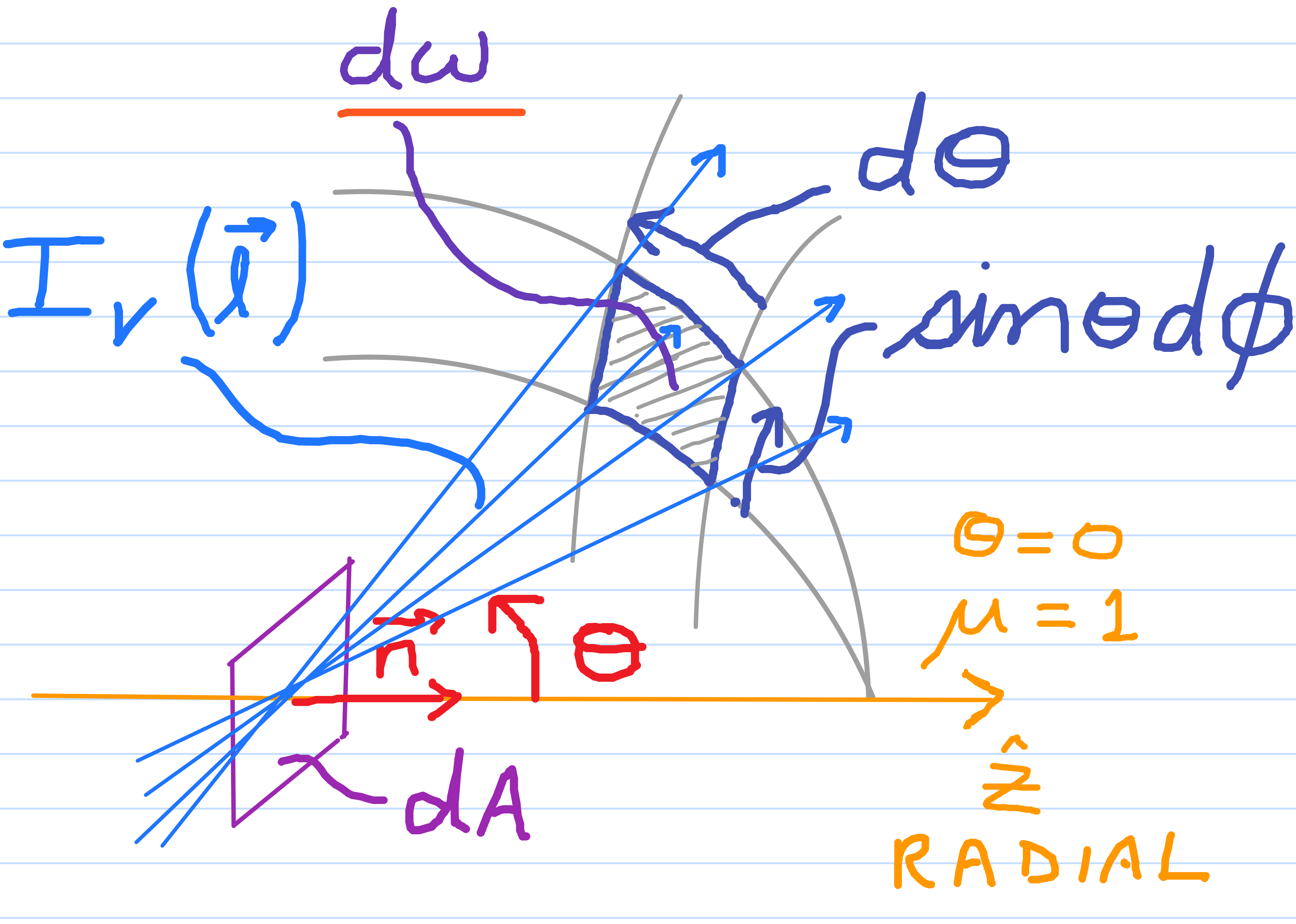
MONOCHROMATIC MEAN INTENSITY,

$J_\nu(\vec{r}, t, \nu)$ $\left(erg/s/cm^2/STER/Hz\right)$

- ANGLE-AVERAGE OF $I_\nu(\vec{l})$



$d\omega = \sin\theta\, d\theta\, d\phi$

$$J_\nu(\vec{r}) \equiv \frac{\oint_0^{4\pi} I_\nu(\vec{r}, \vec{l})\, d\omega}{\oint_0^{4\pi} d\omega}$$

$$= \frac{1}{4\pi} \oint_0^{4\pi} I_\nu(\vec{r}, \vec{l})\, d\omega$$

$$J_\nu(\vec{r}) = \frac{1}{\underbrace{4\pi}_{\text{STER}}} \int_{\theta=0}^{\pi} \int_{\phi=0}^{2\pi} I_\nu(\vec{r}, \theta, \phi) \sin\theta\, d\theta\, d\phi$$

$(erg/s/cm^2/\text{STER}/Hz)$

- SAME AS I_ν

1D AXI-SYMMETRIC MODEL:

$$I_\nu(\vec{r}, \theta, \cancel{\phi}) = I_\nu(\underline{z}, \theta):$$

$$J_\nu(\underline{z}) = \underline{\underline{\frac{2\pi}{4\pi}}} \int_{\theta=0}^{\pi} I_\nu(\underline{z}, \theta) \sin\theta \, d\theta$$

$$= \underline{\underline{\frac{1}{2}}} \int_{\theta=0}^{\pi} I_\nu(z, \theta) \sin\theta \, d\theta$$

$$\mu \equiv \cos\theta \rightarrow d\mu = -\sin\theta \, d\theta$$

$$J_\nu(z) = -\frac{1}{2}\int_{\mu=1}^{-1} I_\nu(z,\mu)\, d\mu$$

$$= \frac{1}{2}\int_{\mu=-1}^{1} I_\nu(z,\mu)\, d\mu > 0$$

SIGNIFICANCE:

$4\pi J_\nu(z)$ = TOTAL MONOCHROM. POWER FROM ALL DIRECTIONS

- eg. PHOTO-IONIZATION RATE

MONOCHROMATIC ENERGY DENSITY,

$$\underline{\mu_\nu}(\vec{r}, t, \nu) \qquad (\mathrm{erg/cm^3/Hz})$$

1D MODEL:

$$\mu_\nu(\underline{z}) = \frac{4\pi}{c} \underline{J_\nu}(z)$$

<u>BOLOMETRIC</u> QUANTITIES:

$$J(z) = \int_{\nu=0}^{\infty} J_\nu(z)\, d\nu$$

$$(\mathrm{erg/s/cm^2/STER})$$

$$\mu(z) = \frac{4\pi}{c} J(z)$$

$$(\mathrm{erg/cm^3})$$