$$\int_m \int_m \delta r^{pT} \cdot f(p,R)\, dm(R)\, dm(p)$$

$$= \frac{1}{2}(\ldots) + \frac{1}{2}(\ldots)$$

$$= \frac{1}{2} \iint_{m\,m} \delta r^{pT} f(p,R)\, dm(R)\, dm(p) + \frac{1}{2} \iint_{m\,m} \delta r^{RT} \cdot f(R,p)\, dm(p) \cdot dm(R)$$

$$= \frac{1}{2} \iint_{m\,m} \delta r^{pT} f(p,R)\, dm(R)\, dm(p) + \frac{1}{2} \int_m \int_m \delta r^{RT} \cdot f(R,p)\, dm(R)\, dm(p)$$

$$= \frac{1}{2} \iint_{m\,m} \delta r^{pT} f(p,R)\, dm(R)\, dm(p) - \frac{1}{2} \iint_{m\,m} \delta r^{RT} \cdot f(p,R)\, dm(R)\, dm(p)$$

$$= \frac{1}{2} \iint_{m\,m} (\delta r^{pT} - \delta r^{RT}) f(p,R)\, dm(R)\, dm(p)$$

$$= \frac{1}{2} \iint_{m\,m} \underbrace{(\delta r^{p} - \delta r^{R})^{T}}_{0} \cdot f(p,R)\, dm(R)\, dm(p) = 0$$