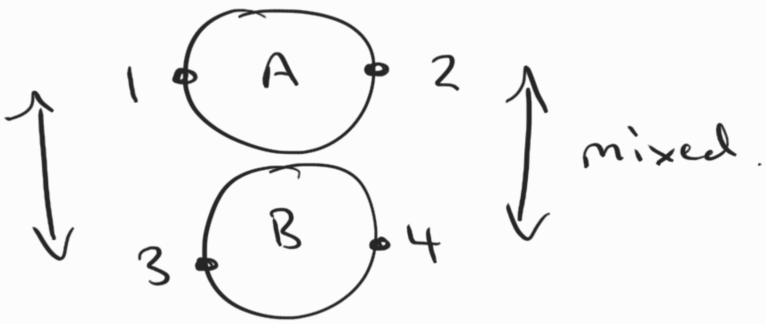
Consider a Rarity-Tapster setup w/ for arbitrary modes:



A & B label the halos. Assume each halo has average mode occupation n_A & n_B respectively. Then, we can also write the relevant anomolous moments as:

$$|m_{12}|^2 = |\langle \hat{a}_1 \hat{a}_2 \rangle|^2 = |m_A|^2 = n_A(1+n_A)$$

$$\& \quad |m_{34}|^2 = |m_B|^2 = n_B(1+n_B)$$

With these in hand, it is straightforward to construct the relevant coincidence counts as:

$$C_{ij} = \frac{1}{2}\left(n_A^2 + n_B^2\right) + \frac{1}{4}\left(|m_A|^2 + |m_B|^2\right)$$
$$\pm \frac{1}{2}|m_A||m_B| \cos(\Delta\phi)$$

& thus the correlation coefficient,

$$E(\Delta\phi) = \frac{2|m_A||m_B| \cos(\Delta\phi)}{2(n_A^2+n_B^2) + |m_A|^2+|m_B|^2}$$

or,

$$\frac{2\left[n_A(1+n_A)\, n_B(1+n_B)\right]^{1/2}}{3n_A^2+3n_B^2+n_A+n_B} \cos(\Delta\phi)$$

$$\Downarrow$$