$$\int Poiss.(n, \langle n_\nu(E_\nu, r)\rangle) P(E_\nu) dE_\nu \times$$
$$P_{E_{GW}}\left(\frac{r_{GW}^2 \rho^2}{k_0^2}\right) r_{GW}^2 \times$$
$$(t_\nu, t_{GW}\ overlap\ integral) \times$$
$$(spatial\ overlap)$$