

# The GaSp Array - Figure of Merit

$$P_F = \alpha N_o \epsilon_o (k \epsilon_{Ph})^F \quad \text{Area of F-fold peak}$$

$\alpha$  Population intensity

$N_o$  Number of reactions

$k$  Fraction of peak area in gate

$\epsilon_{Ph}$  Total photopeak efficiency of the array

$\epsilon_o$  Efficiency of ancillary detectors

$$PB_F = \alpha R_o (kR)^F \quad \text{Peak to Background}$$

$$R = \frac{SE_\gamma}{\Delta E_\gamma} PT \quad \text{Resolving power}$$

$SE_\gamma$  Energy separation

$\Delta E_\gamma$  Energy resolution

$PT$  Peak to Total ratio

$R_o$  Resolving power of ancillary detectors

$$\alpha_{stat} = P_F / N_o \epsilon_o (k \epsilon_{Ph})^F \quad \text{Statistical limit}$$

$$\alpha_{back} = PB_F / R_o (kR)^F \quad \text{Background limit}$$

$$\alpha_{limit} = \min(\alpha_{stat}, \alpha_{back}) \quad \leftarrow \text{Figure of merit}$$

## Observational limit

