

$$P(\sigma|N_{obs}) = \underbrace{\beta}_{\beta} \times \underbrace{\int \mathcal{L}(N_{obs}|\alpha, n_B, \sigma)}_{\mathcal{L}(N_{obs}|\alpha, n_B, \sigma)} \underbrace{\times \pi(\alpha, n_B)}_{\pi(\alpha, n_B)} \underbrace{\pi(\sigma)}_{\pi(\sigma)} \underbrace{d\alpha dn_B}_{d\alpha dn_B}$$