$$b_B(\ell)$$

$$\{0,\ldots,\ell_{\max}\}$$

$$a_{\ell m}^X b_X(\ell),$$

$$C_{\ell m}^{XY}$$

$$C_{\ell m}^{XY}b_X(\ell)b_Y(\ell),$$

$$X, Y \in \{T, E, B\}$$

$$\partial^2 X/(\partial\theta\partial\phi\sin\theta)$$

$$a_{\ell m}^{\rm IN} \frac{B^{\rm OUT}(\ell)P^{\rm OUT}(\ell)}{B^{\rm IN}(\ell)P^{\rm IN}(\ell)},$$

$$P(\ell) = 1$$

$$\mathcal{O}(N_{\rm pix}^{1/2}\ell_{\rm max}^2)$$

 $\ell_{\rm max} \approx$ $\sim 2 \cdot N_{\mathrm{side}}$

$$\frac{4\pi}{N_{\text{pix}}} \sum_{p} w(p) Y_{\ell m}(p) = \sqrt{4\pi} \delta_{\ell 0} \delta_{m0}$$

 $|m| \le \ell \le 3N_{\rm side}$

 $\ell_{
m max}$ $1.5N_{\rm side}$ $N_{\rm side}$

$$\ell_{\text{max}} = 3 \cdot N_{\text{side}} - 1$$

 $\delta C_{\ell} \propto \epsilon \cdot C_{\ell}$

$$2 \cdot N_{\text{side}} < \ell_{\text{max}} < 3 \cdot N_{\text{side}} - 1$$

 $\ell > 3 \cdot N_{\text{side}} -$

$$P_{\ell m}(\theta)$$



$$P_{lm}(\theta)$$

$$N_{\lambda} = \mathtt{nsmax}(\mathtt{nlmax} + 1)(\mathtt{nlmax} + 2)$$

 $N_{\lambda} < 2^{31}$ 2147483648

$$\propto N_{\rm pix}^p \propto N_{\rm side}^{2p}$$

 $\rho_{\text{SHO}}(t) = |\psi_n|^2 = e^{-t^2/2\sigma_0^2} \left| \sum_{i=0}^n \alpha_i C_i H_i \left(\frac{t}{\sqrt{2}\sigma_0} \right) \right|^2$

$$|\psi_0|^2$$
,

$$\alpha_0 = (1 - \sum_{i=1}^{n} |\alpha_i|^2)^{1/2}$$

$$a_{\ell m} \longrightarrow a_{\ell m} \left[C(l) \right]^{1/2} B(\ell) w_{\text{pix}}(\ell)$$

$$C(\ell)B(\ell)^2 w_{\rm pix}(\ell)^2$$

$$\sigma_0 = 1$$

$$\alpha_i = (0, 0, 0.2)$$



$$C_{\ell}^{T \times E}$$

$$(\partial T/\partial \theta, \partial T/\partial \phi/\sin \theta)$$

$$(\partial^2 T/\partial \theta^2, \partial^2 T/\partial \theta \partial \phi/\sin \theta,$$

 $\partial^2 T/\partial \phi^2/\sin^2 \theta$

$$(\partial T/\partial \theta, \partial Q/\partial \theta, \partial U/\partial \theta; \partial T/\partial \phi/\sin \theta, \ldots)$$

$$(\partial^2 T/\partial \theta^2, \dots; \partial^2 T/\partial \theta \partial \phi/\sin \theta, \dots;$$

 $\partial^2 T/\partial \phi^2/\sin^2 \theta \dots$

$$C_{\ell}^{T \times B} \neq 0$$

$$C_{\ell}^{E \times B} \neq 0$$



$$\partial^2 X/(\partial\theta\partial\varphi\sin(\theta))$$

$$\ell(\ell+1)C(\ell)/2\pi$$

$$\partial(Q,U)/\partial\theta$$

$$\partial^2(Q,U)/\partial\theta^2$$

$$\partial^2(Q,U)/(\partial\theta\partial\varphi\sin\theta)$$

$$\Delta \equiv \left(\frac{\partial^2}{\partial \theta^2} + \cot \theta \frac{\partial}{\partial \theta} + \frac{\partial^2}{\sin^2 \theta \partial \varphi^2}\right)$$