SIMPLIFICATIONS

- t_i used to multiply B0 by in A increase only in discrete steps for each phase-encode step
- Ignore any susceptibility in frequency-encode direction

$$\mathbf{K} = \begin{bmatrix} \underbrace{\mathbf{K}_1}_{n\times n} & \mathbf{0} & \cdots & \mathbf{0} \\ \mathbf{0} & \underbrace{\mathbf{K}_2}_{n\times n} & \cdots & \mathbf{0} \\ \vdots & \vdots & \ddots & \vdots \\ \mathbf{0} & \mathbf{0} & \cdots & \underbrace{\mathbf{K}_n}_{n\times n} \end{bmatrix}$$

$$\hat{\boldsymbol{\rho}}_i = \mathbf{K}_i^{+}\mathbf{f}_i$$

$$\mathbf{F}_{jk} = e^{-2\pi\sqrt{-1}\frac{\left(j-\frac{n}{2}-1\right)\left(k-\frac{n}{2}-1\right)}{n}}, \quad j, k = 1, 2, \ldots, n$$

$$[\mathbf{A}_i]_{jk} = e^{-2\pi\sqrt{-1}\left(\frac{\left(j-\frac{n}{2}-1\right)\left(k-\frac{n}{2}-1\right)}{n} + \frac{j}{n}\Delta B_0(x_i, y_k)\right)}$$

$$A^{+} = (A^T A)^{-1} A^T$$

Kadah and Hu, 1997

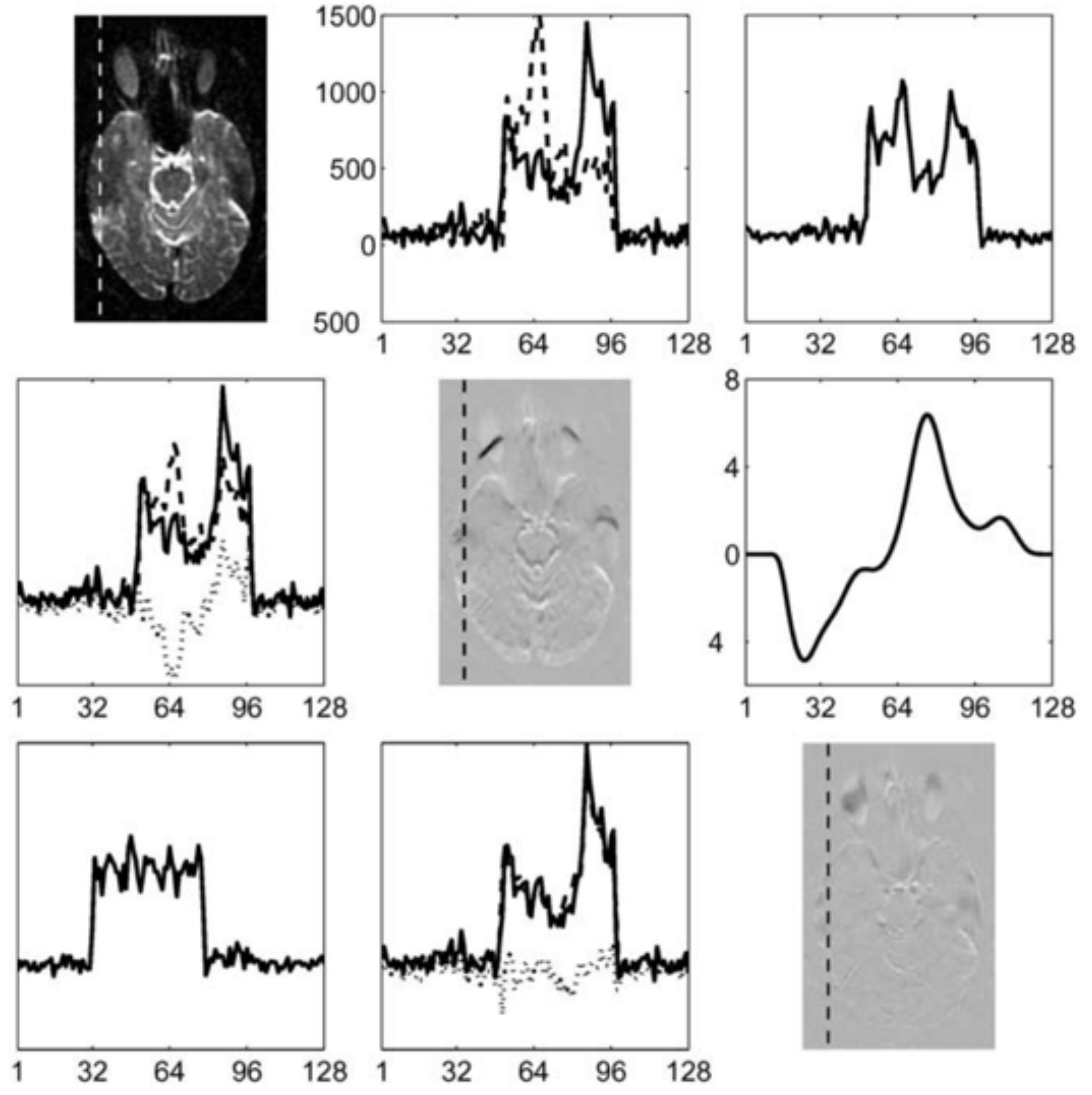
INVERSE FOR SURE

$$\underbrace{\begin{bmatrix}\widehat{\mathbf{e}_+}\\ \widehat{\mathbf{e}_+}\end{bmatrix}}_{2n\times1} = \underbrace{\mathbf{R}(\mathbf{b})}_{2n\times2n}\underbrace{\begin{bmatrix}\mathbf{f}_+\\ \mathbf{f}_-\end{bmatrix}}_{2n\times1}$$

$$\underbrace{\mathbf{R}(\mathbf{b})}_{2n\times2n} = \underbrace{\mathbf{I}}_{2n\times2n} - \underbrace{\begin{bmatrix}\mathbf{K}_+(\mathbf{b})\\ \mathbf{K}_-(\mathbf{b})\end{bmatrix}}_{2n\times1}$$

$$\times \underbrace{\left([\mathbf{K}_+^T(\mathbf{b}) \quad \mathbf{K}_-^T(\mathbf{b})]\begin{bmatrix}\mathbf{K}_+(\mathbf{b})\\ \mathbf{K}_-(\mathbf{b})\end{bmatrix}\right)^{-1}}_{n\times n}$$

$$\times \underbrace{[\mathbf{K}_+^T(\mathbf{b}) \quad \mathbf{K}_-^T(\mathbf{b})]}_{n\times2n},$$



$$\min_{\arg=\mathbf{b}} O(\mathbf{b}) = \left(\sum_{c=1}^{m}[\mathbf{f}_{c+}^T \quad \mathbf{f}_{c-}^T]\mathbf{R}_c(\mathbf{b})\begin{bmatrix}\mathbf{f}_{c+}\\ \mathbf{f}_{c-}\end{bmatrix}\right)$$