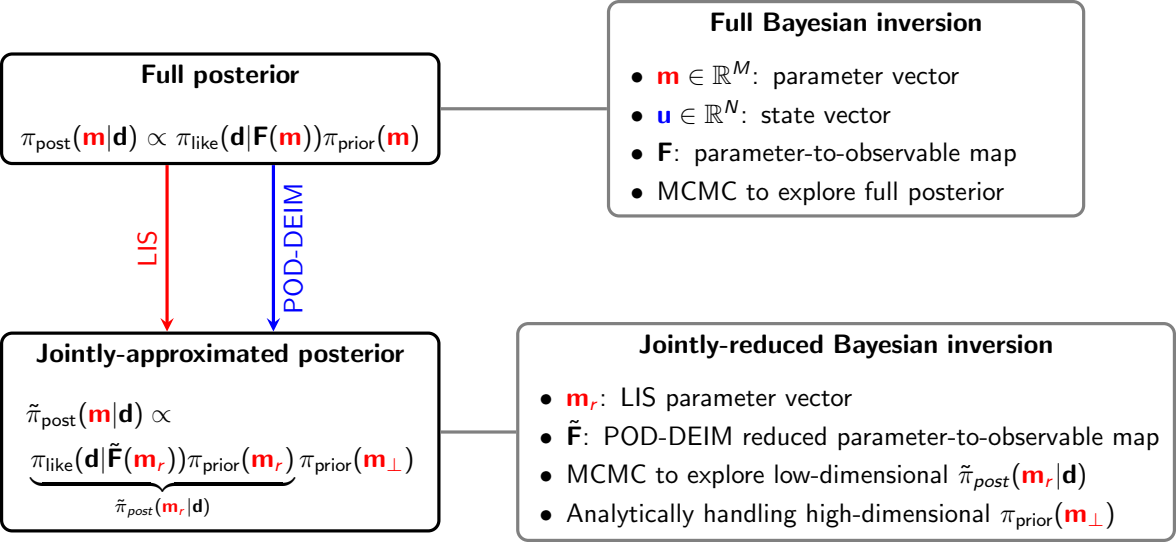
Full posterior
$\pi_{\text{post}}(\mathbf{m}|\mathbf{d}) \propto \pi_{\text{like}}(\mathbf{d}|\mathbf{F}(\mathbf{m}))\pi_{\text{prior}}(\mathbf{m})$
Full Bayesian inversion
• $\mathbf{m} \in \mathbb{R}^M$: parameter vector
• $\mathbf{u} \in \mathbb{R}^N$: state vector
• $\mathbf{F}$: parameter-to-observable map
• MCMC to explore full posterior
LIS
POD-DEIM
Jointly-approximated posterior
$\tilde{\pi}_{\text{post}}(\mathbf{m}|\mathbf{d}) \propto$
$\underbrace{\pi_{\text{like}}(\mathbf{d}|\tilde{\mathbf{F}}(\mathbf{m}_r))\pi_{\text{prior}}(\mathbf{m}_r)}_{\tilde{\pi}_{post}(\mathbf{m}_r|\mathbf{d})}\pi_{\text{prior}}(\mathbf{m}_\perp)$
Jointly-reduced Bayesian inversion
• $\mathbf{m}_r$: LIS parameter vector
• $\tilde{\mathbf{F}}$: POD-DEIM reduced parameter-to-observable map
• MCMC to explore low-dimensional $\tilde{\pi}_{post}(\mathbf{m}_r|\mathbf{d})$
• Analytically handling high-dimensional $\pi_{\text{prior}}(\mathbf{m}_\perp)$