

phase field ϕ

1

.5

0

-1

0

1

- phase field
- level set
- composition
- sharp interface

gamma: γ
Omega: Ω

$$|\nabla \phi| = 1, \quad \frac{\partial \phi}{\partial t} + U |\nabla \phi| = 0$$

level set ϕ

0

1

$$\mathcal{F} = \int f(\phi, c) dV, \quad \frac{\partial \phi}{\partial t} = -M_\phi \frac{\delta \mathcal{F}}{\delta \phi}$$

δ