User Prompts

- A tennis ball is gently placed on the surface of a bucket filled with water.
- A puddle of oil on the road under the sunlight.

...

p_+

Physics-Aware Reasoning

Tennis ball
A puddle of oil
…

Buoyancy
Interference Effects
…

Entities → Interactions → Scenes

Open air
Presence of heat source
…

Counterfactual Prompts

- A tennis ball is gently placed on the surface of a bucket filled with water, but instead of floating, it immediately sinks straight to the bottom without resistance, as if its density were far greater than that of water.
- A puddle of oil on the road under the sunlight appears completely transparent and colorless, showing no iridescent effects or interference patterns regardless of the viewing angle or film thickness.

...

p_-

Synchronized Decoupled Guidance

Original Branch

$$\epsilon^+ = \epsilon_\theta(x_t^+, c(p_+), t) + w \cdot \left(\epsilon_\theta(x_t^+, c(p_+), t) - \epsilon_\theta(x_t^+, \emptyset, t)\right)$$

$x_T^+ \rightarrow \cdots \rightarrow x_t^+ \rightarrow x_0^+$

$$\hat{\epsilon}^+ = \epsilon^+ + \lambda \cdot \frac{\epsilon^+ - \epsilon^-}{\|\epsilon^+ - \epsilon^-\| + \varepsilon}$$

$x_T^- \rightarrow \cdots \rightarrow x_t^- \rightarrow x_0^-$

$$\epsilon^- = \epsilon_\theta(x_t^-, c(p_-), t) + w \cdot \left(\epsilon_\theta(x_t^-, c(p_-), t) - \epsilon_\theta(x_t^-, \emptyset, t)\right)$$

Counterfactual Branch