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## Local levels of dissipation rate of turbulent kinetic energy in a rotor-stator mixer with different stator slot widths—an experimental investigation

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### Highlights

- Four stator slot widths were characterized using PIV and torque measurement.
- Dissipation rate of TKE was estimated using a SGS model.
- Power-draw decreases with increasing slot width.
- The local maximum dissipation rate of TKE increases with slot width.
- The dissipation rate trend was validated using emulsification experiments.

### Abstract

Rotor-stator mixers (RSMs) are widely used for emulsification and mixing. However, relatively little is known about the relationship between RSM design, hydrodynamics and performance. Previous studies have investigated shaft power draw as a function of design. However, power draw alone is not sufficient to predict efficiency. In order to understand the effect on performance it is important to investigate how the local turbulent stress is influenced by design parameters.

This study investigates the effect of stator slot width on the local dissipation rate of turbulent kinetic energy using particle image velocimetry coupled with a sub-resolution modeling approach

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