

Superfluid at the nanoscale

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Liquid ^4He cooled down below 2.17 K undergoes a superfluid phase transition, when it can move without viscous friction.

Thanks to this unique property, superfluid helium can flow through highly confined volumes.

Therefore, it is a suitable

medium to experimentally investigate quasi-2D flows. In our work we focused on quasi-2D turbulence, its detection

using the 4th sound resonances and temporal decay. Furthermore, we studied the Kosterlitz-Thouless transition in the

ultraconfined (10 nm, 15 nm, 20 nm) helium films. For our investigation we used single- or double-basin Helmholtz

resonators [1-5].

[1] F. Novotný, et al., *Journal of Low Temperature Physics* 216 (3), 656-667 (2024)

[2] F. Novotný, et al., *New Journal of Physics* 27 (4), 043020 (2025)

[3] F. Novotný, et al., *Physical Review Fluids* 10 (5), 054605 (2025)

[4] F. Novotný, et al., *Physical Review Letters* 136 (8), 084003 (2026)

[5] F. Novotný, et al., arXiv preprint arXiv:2603.02388 (2026)