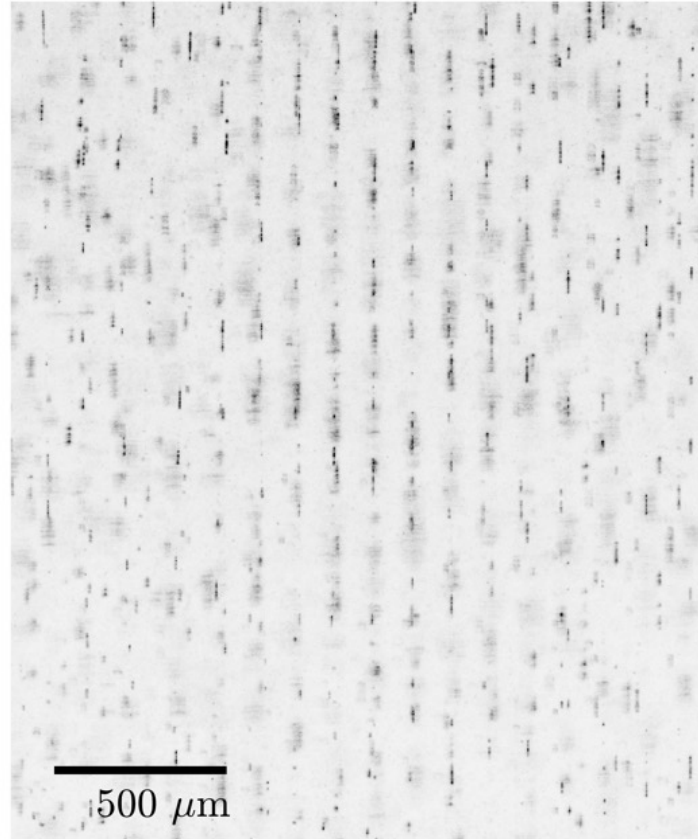


DIRECT VISUALIZATION OF THE QUANTUM VORTEX LATTICE STRUCTURE, OSCILLATIONS AND DESTABILIZATION IN ROTATING ^4He

C. Peretti, J. Vessaire, E. Durozoy, M. Gibert
[In Press] June 2023



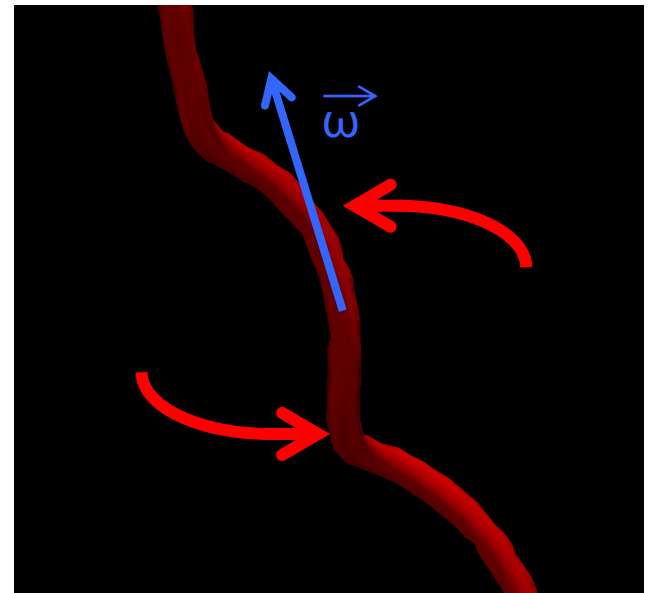
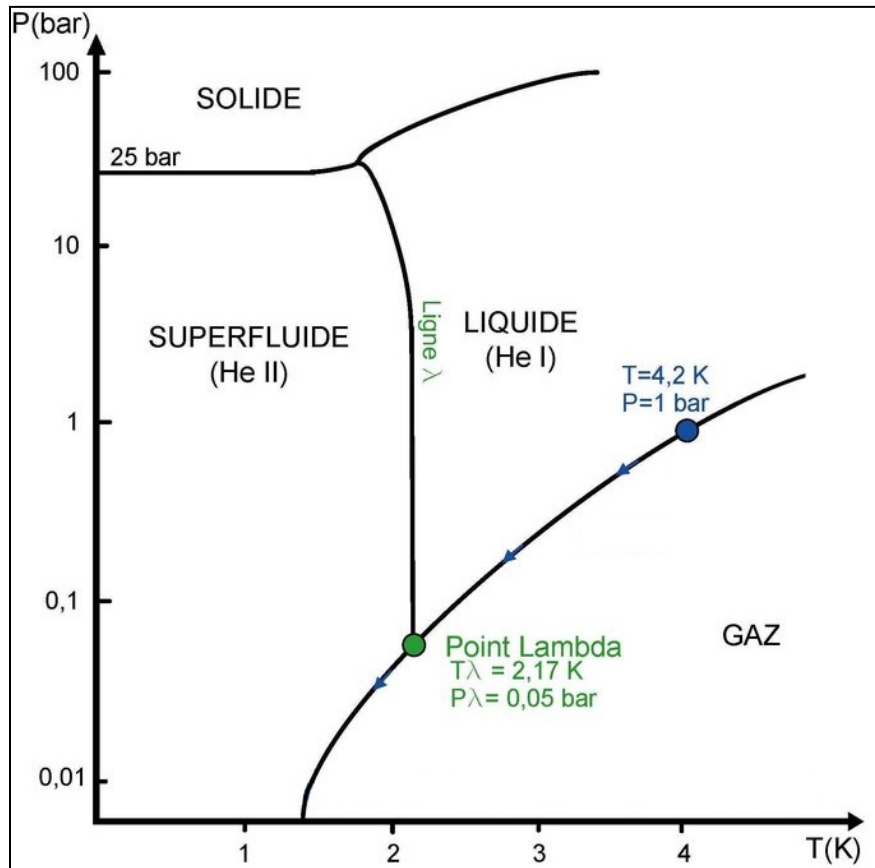
Institut Néel
Supervisor Mathieu Gibert



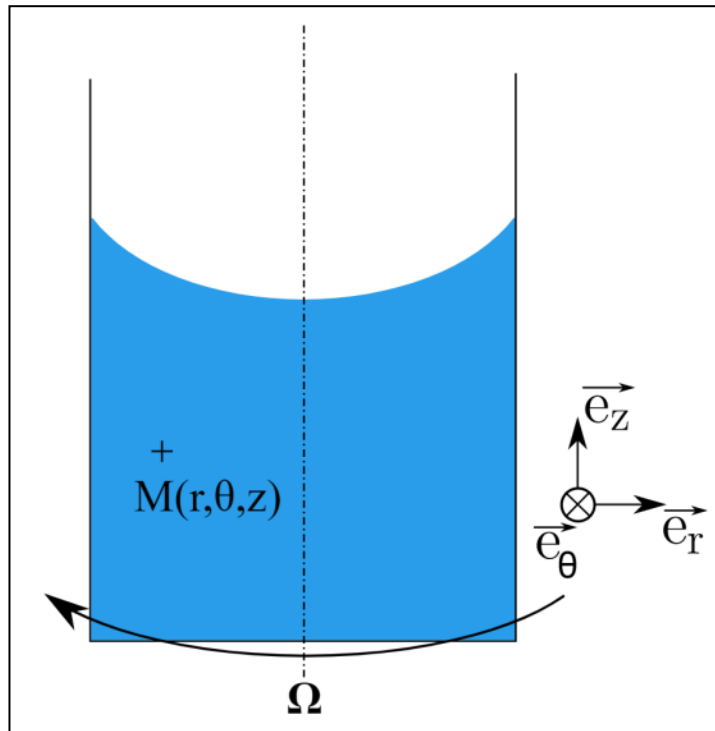
Cargèse July 2023



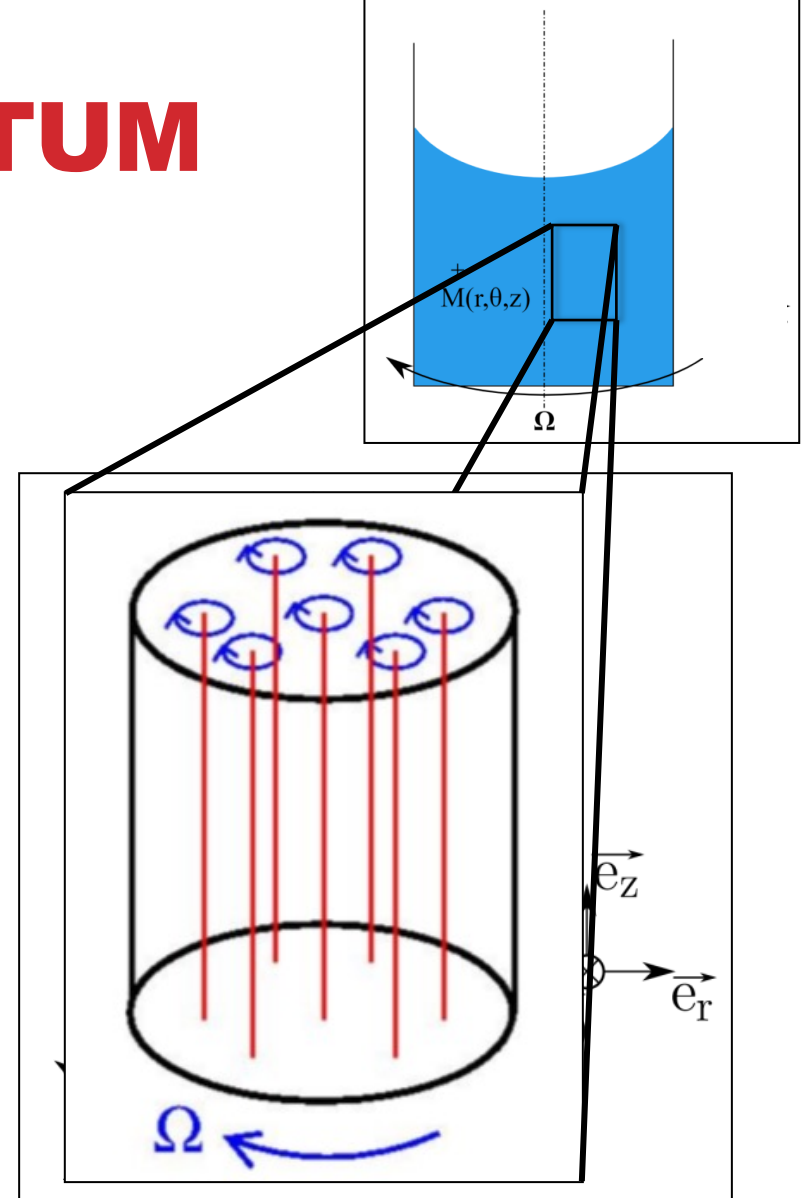
HELIUM II



GENERATE QUANTUM VORTICES

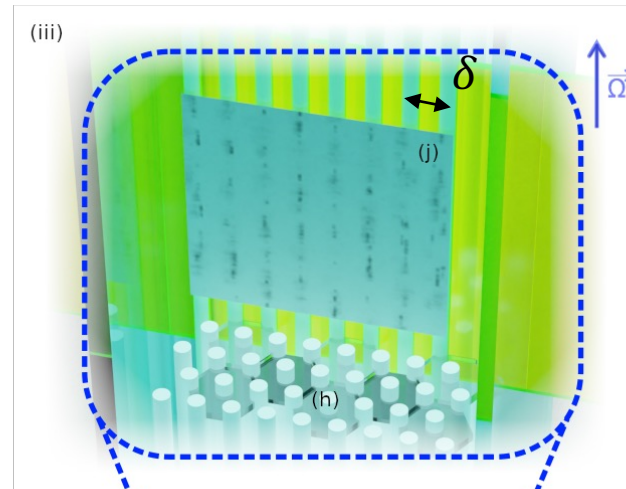
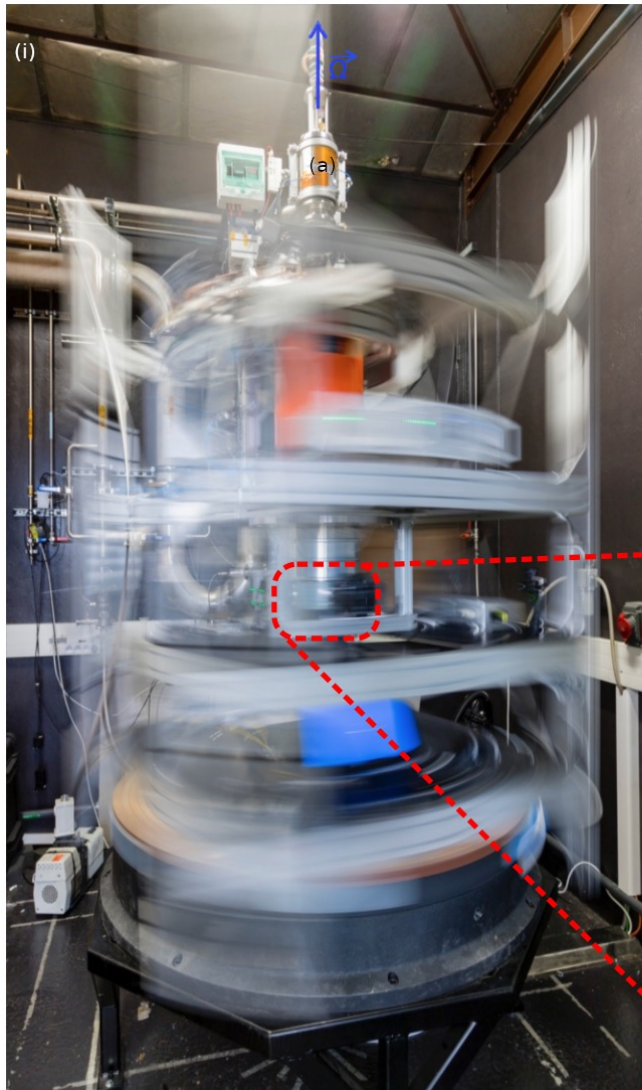


Classical Fluid

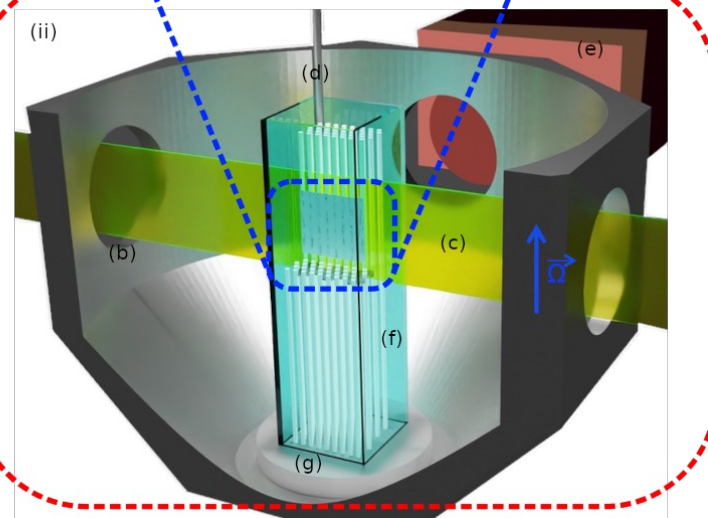


He II

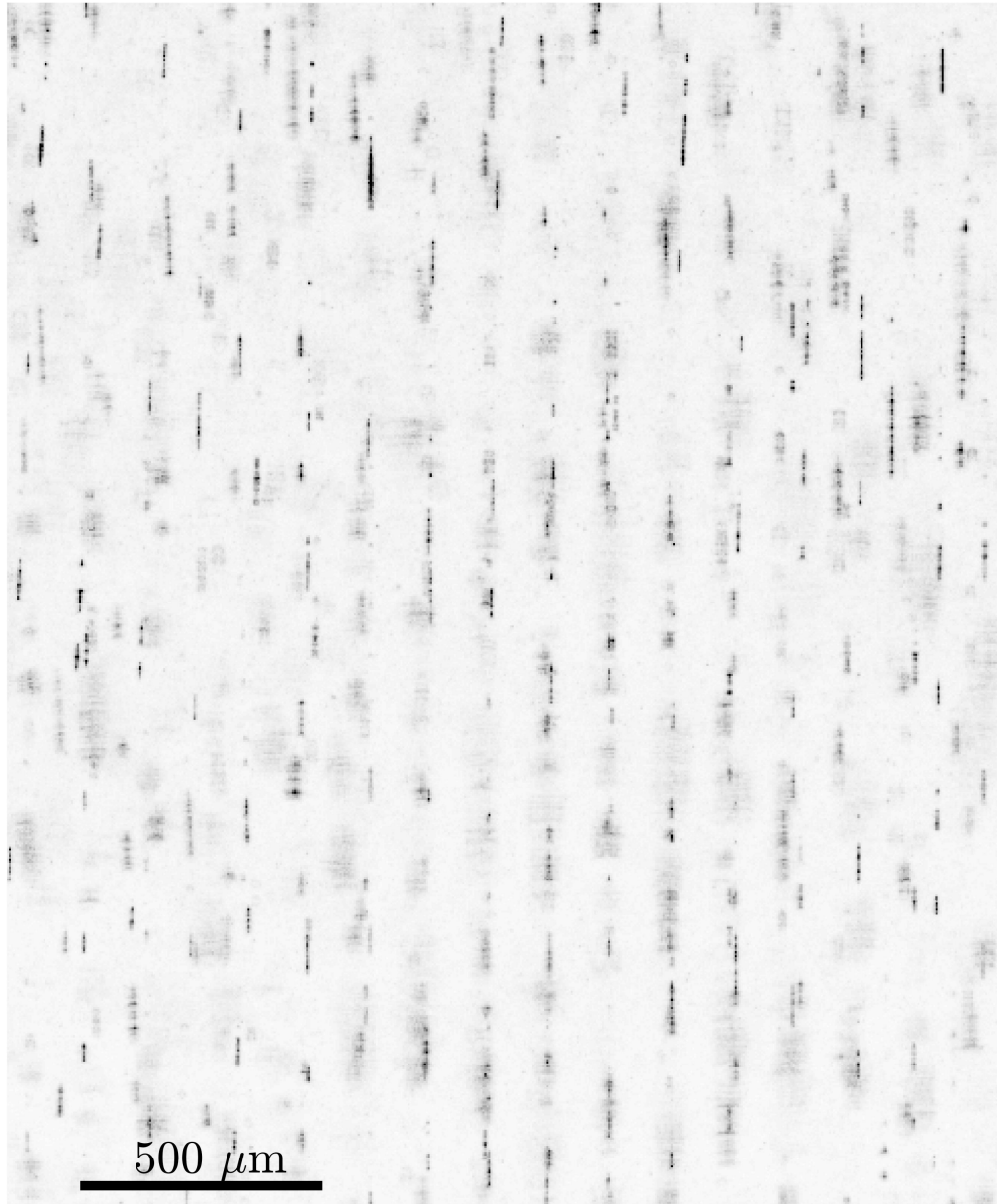
EXPERIMENTAL SETUP



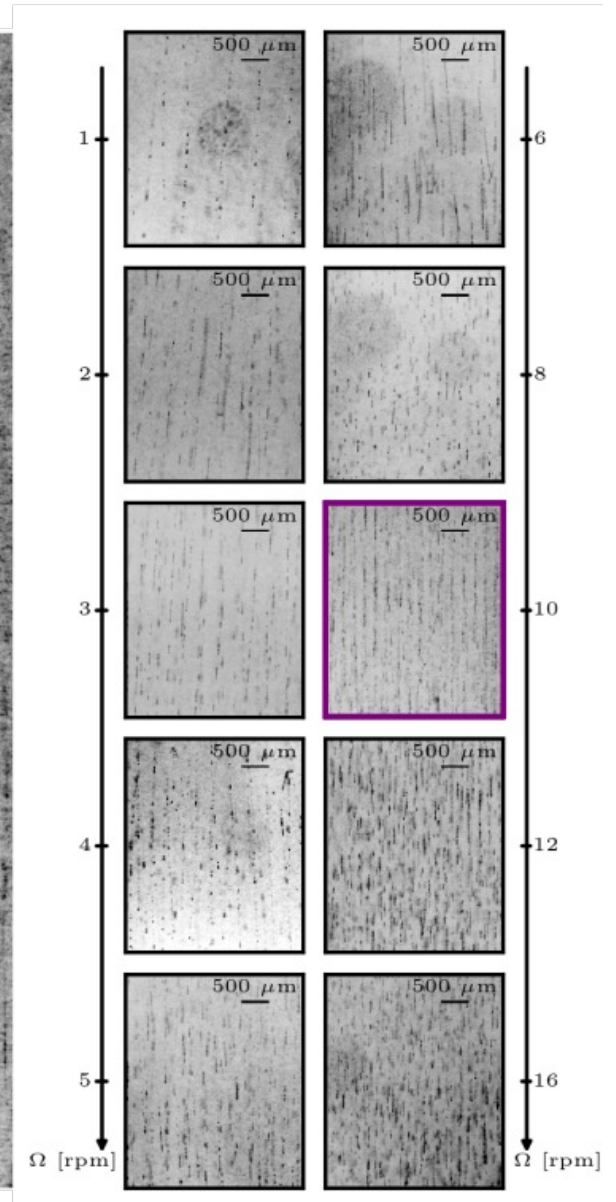
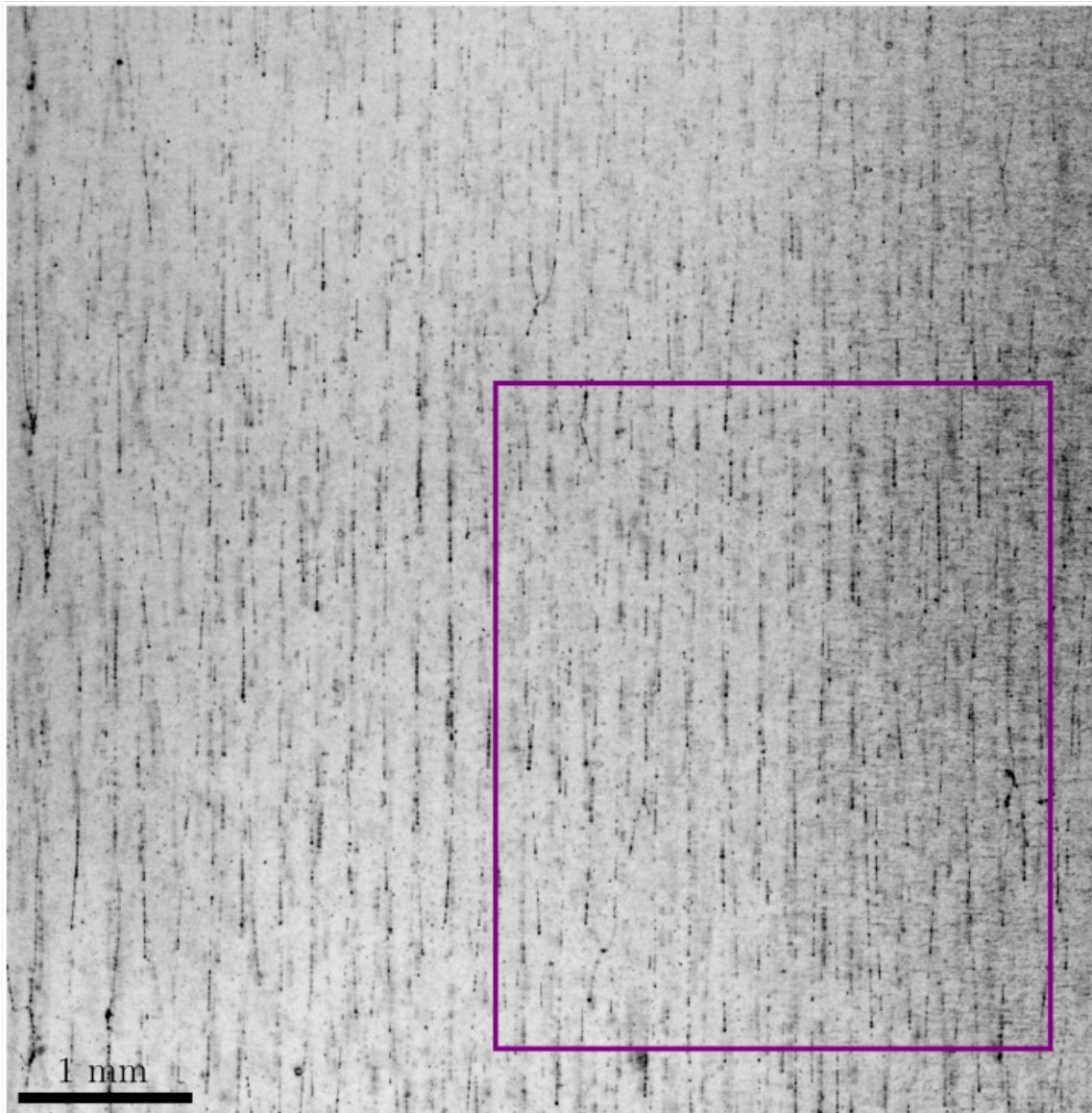
$$\delta = \sqrt{\frac{\kappa}{2\Omega}}$$



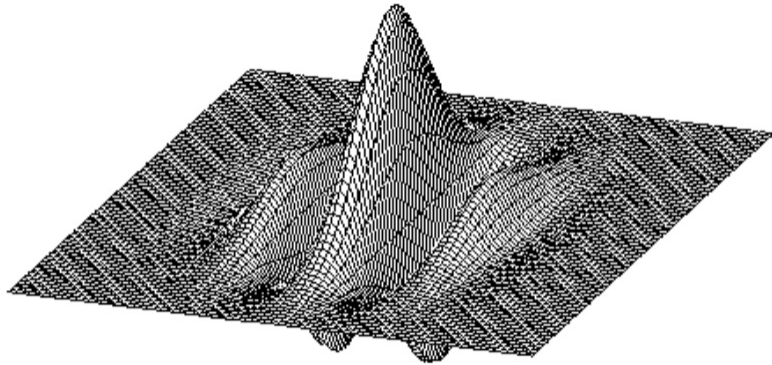
SIMPLE ROTATION



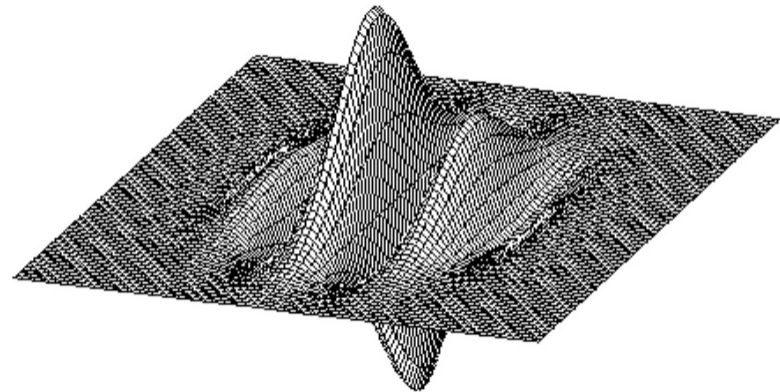
SIMPLE ROTATION



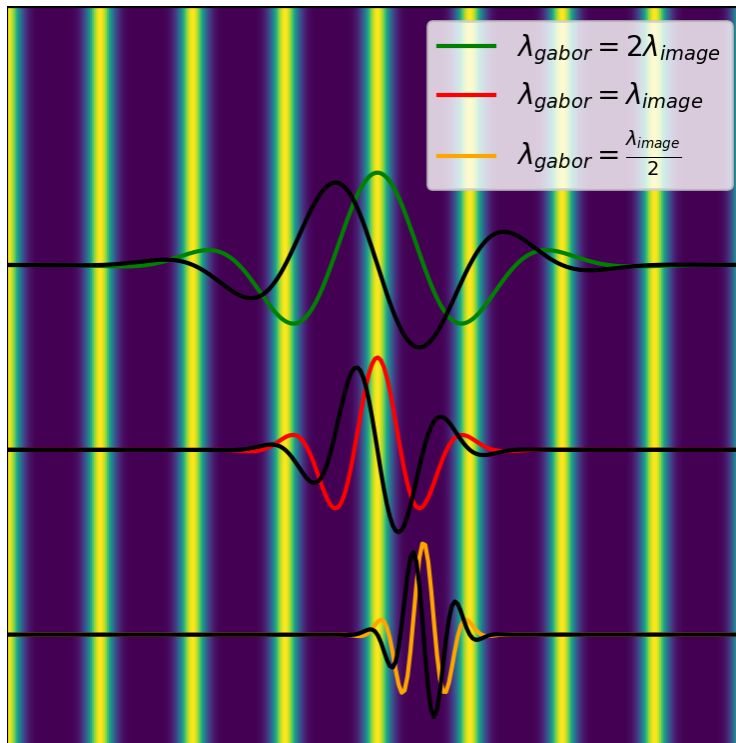
GABOR



Real Part

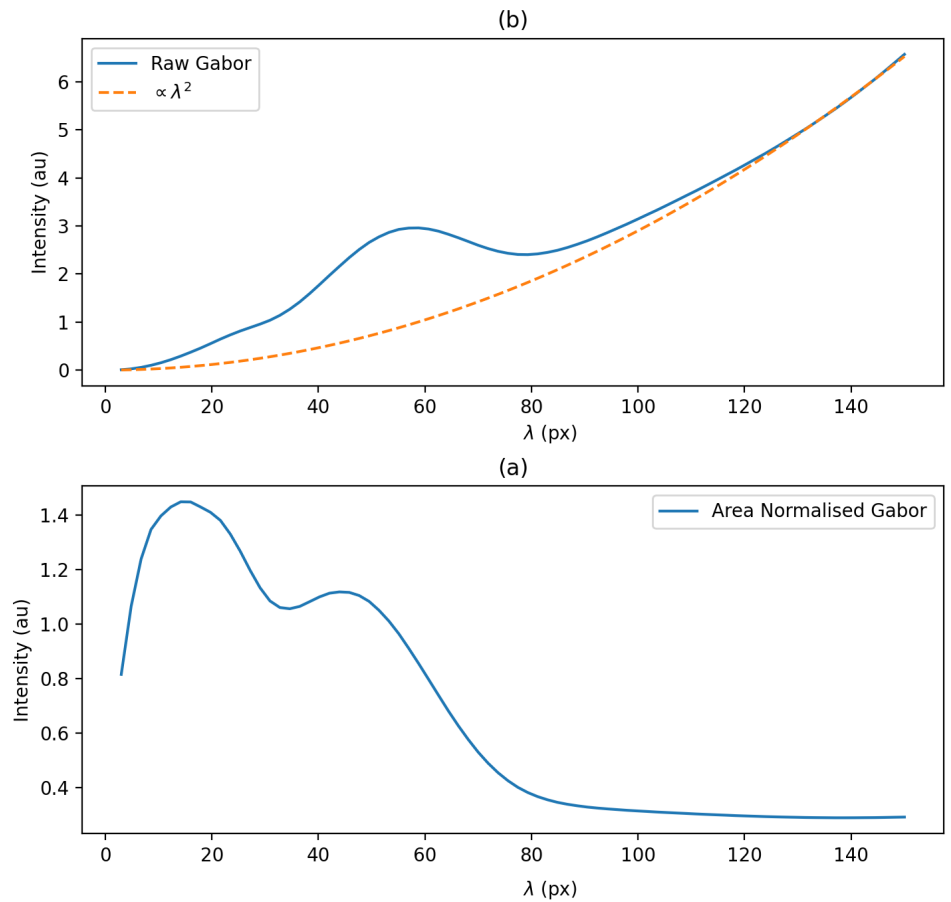
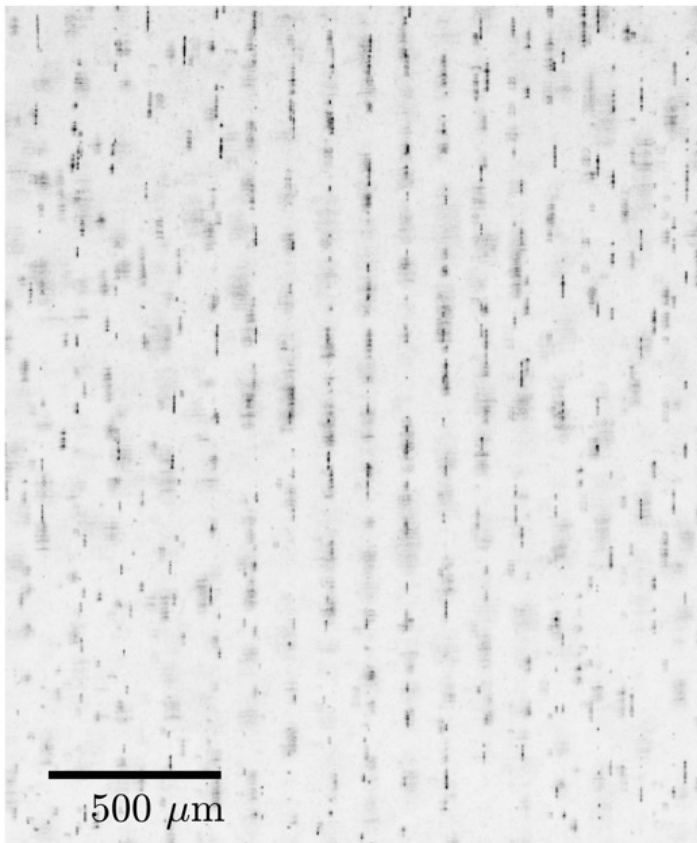


Imaginary Part

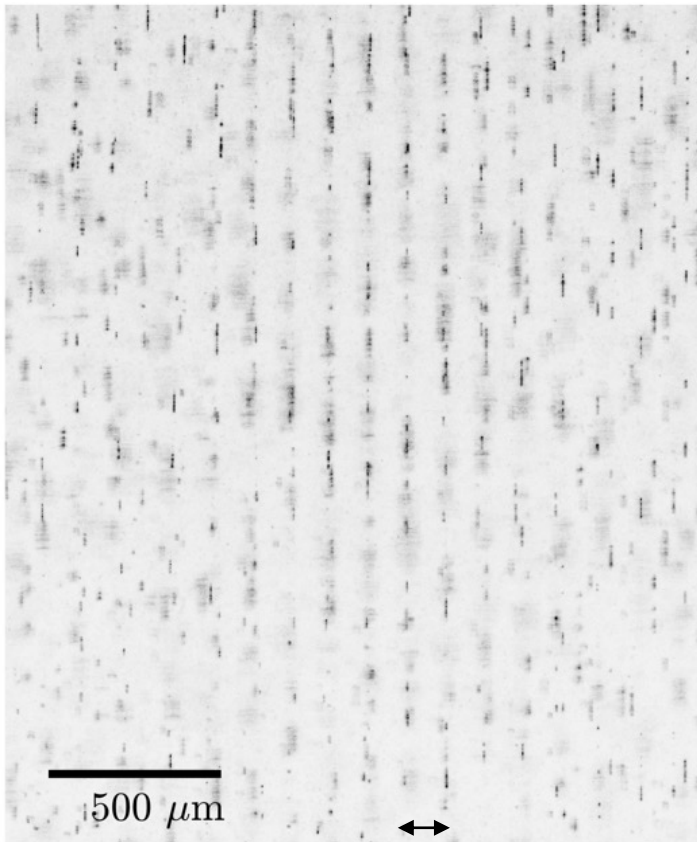


$$G(x, y) = \exp\left(-\frac{x^2 + y^2}{2\sigma^2}\right) \exp\left(i\frac{2\pi x}{\lambda}\right)$$

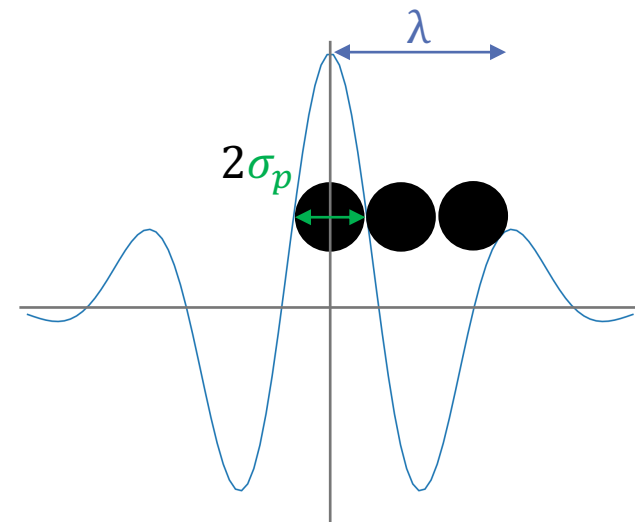
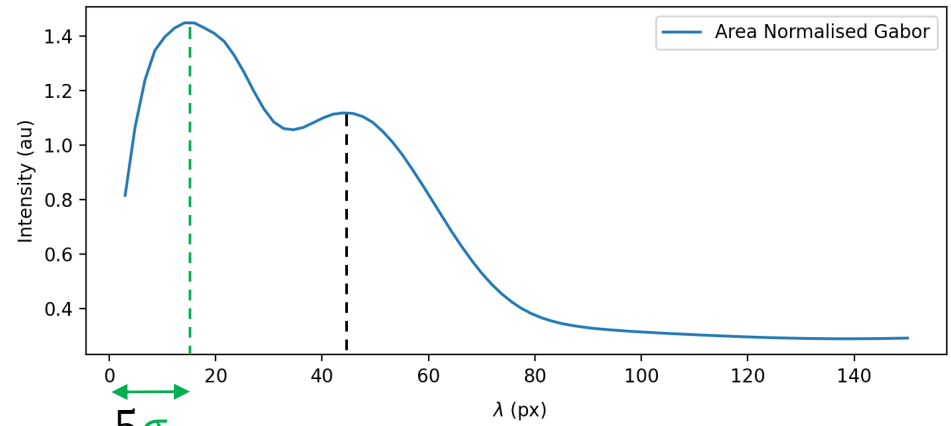
GABOR AS A TOOL



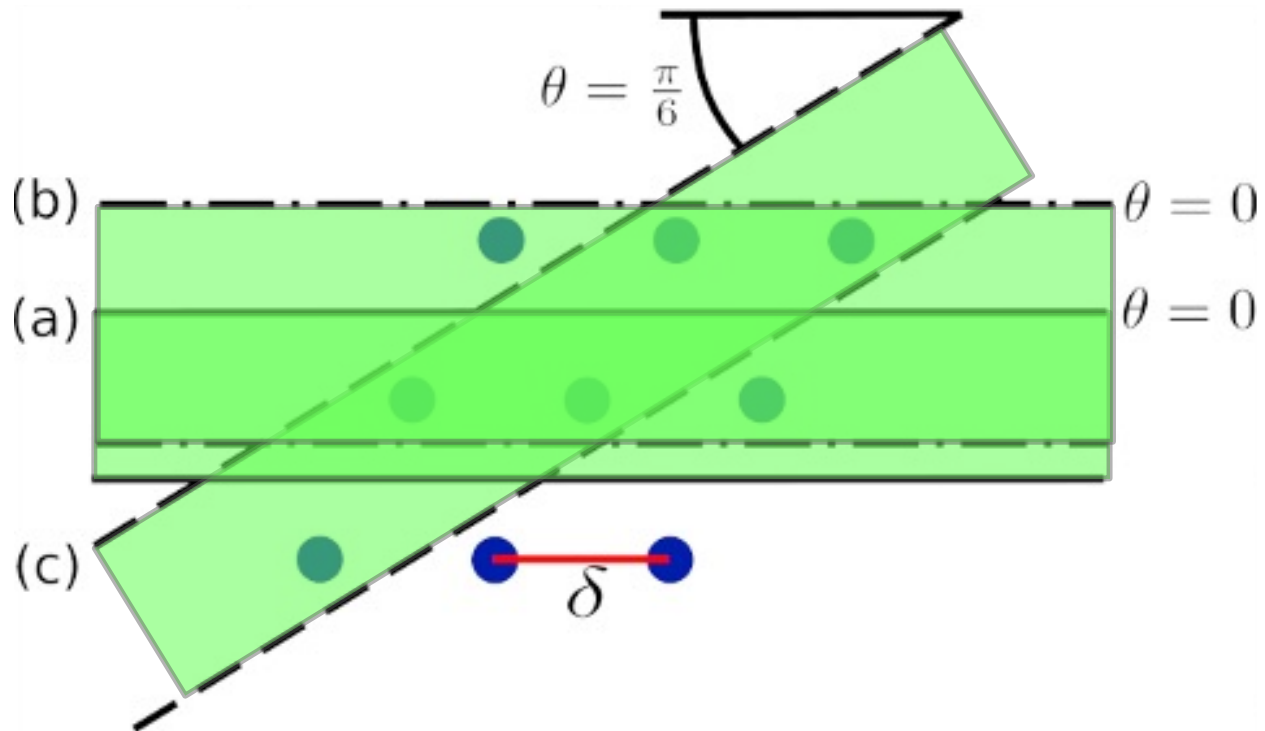
MESURE DELTA



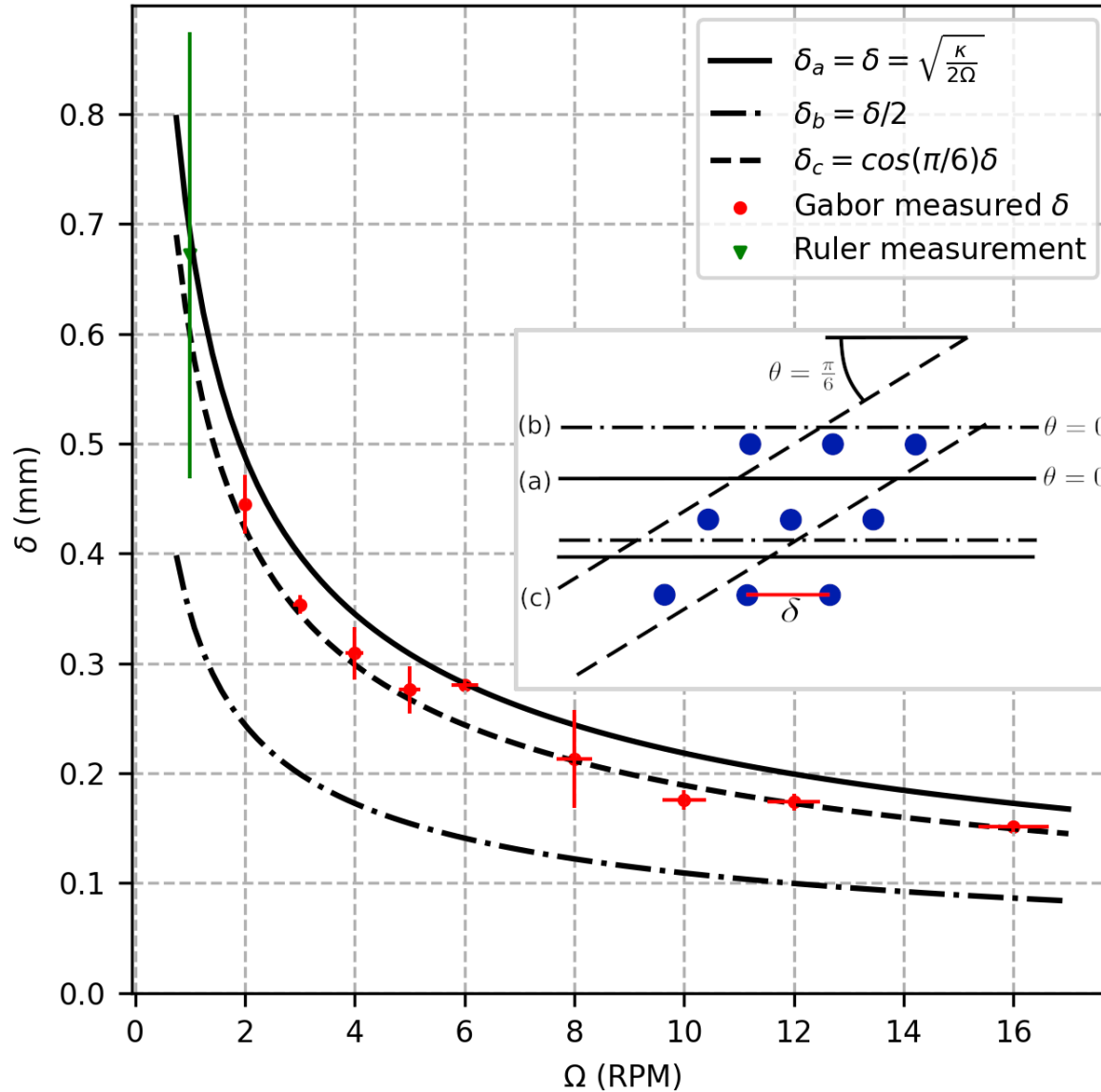
$$\delta = \sqrt{\frac{\kappa}{2\Omega}}$$



LASER/LATTICE ORIENTATION

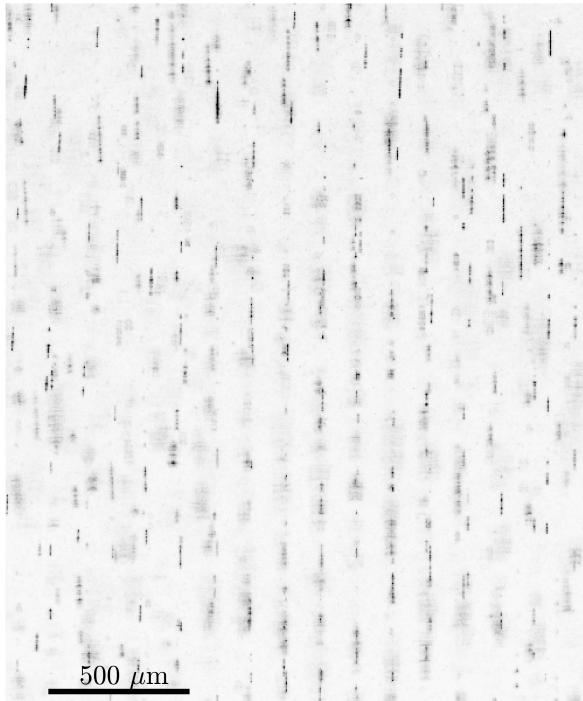
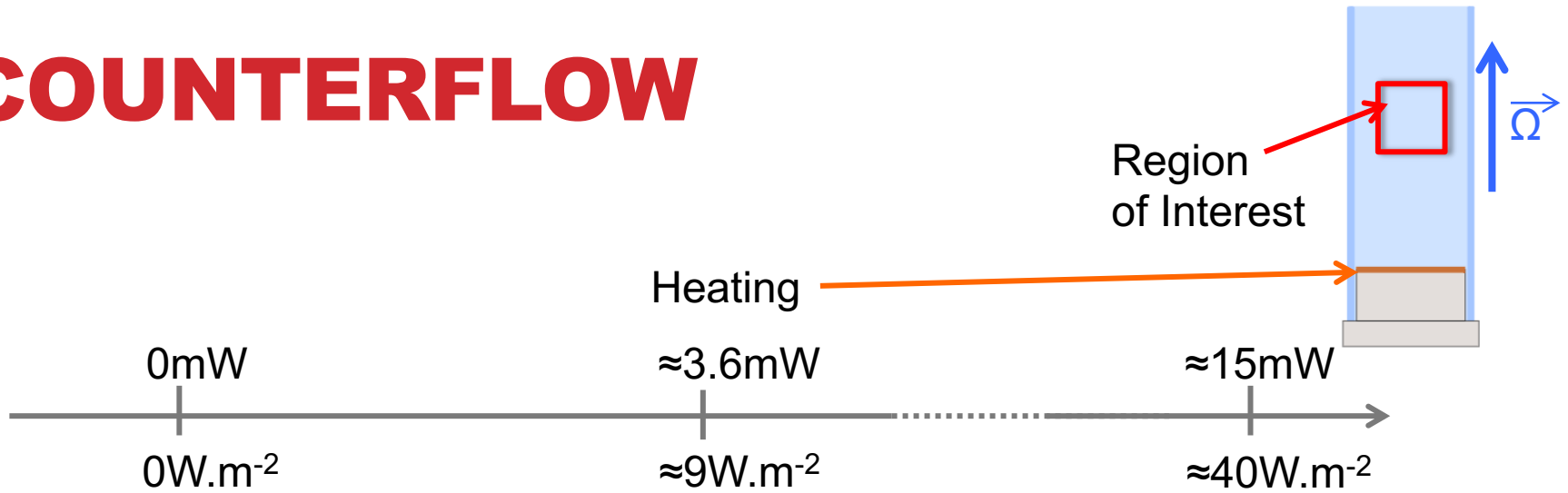


MAIN RESULT

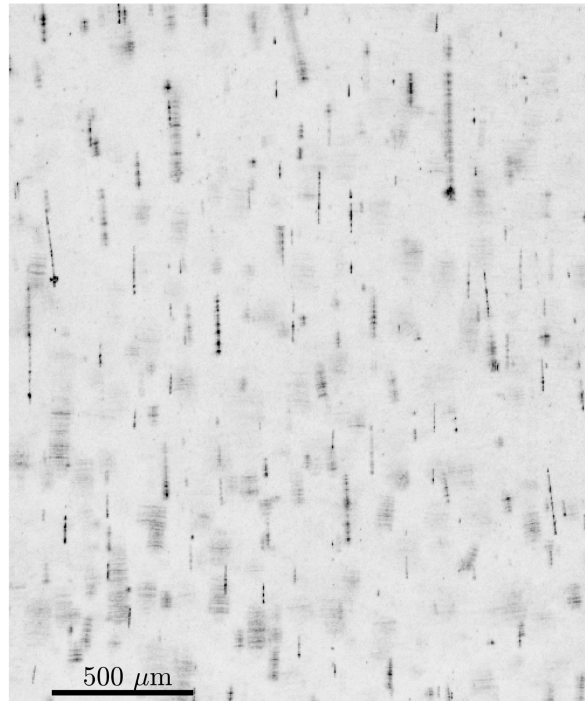


50 000 images
(500GB)

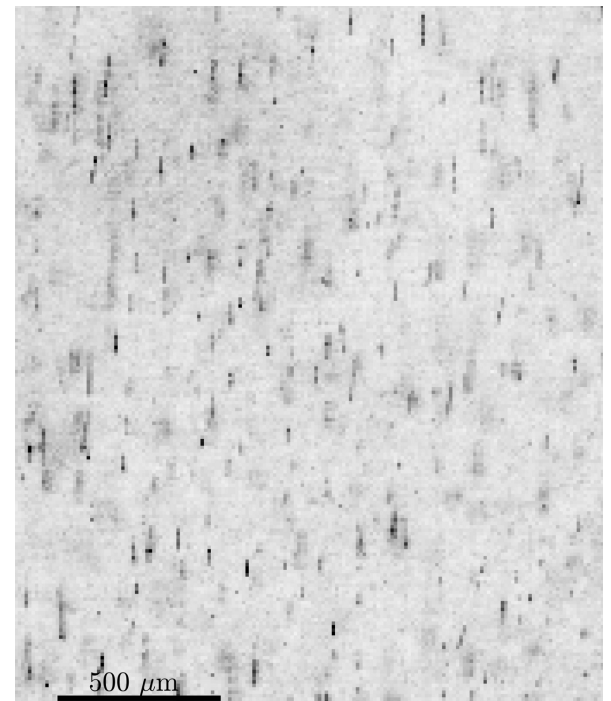
COUNTERFLOW



Stationary

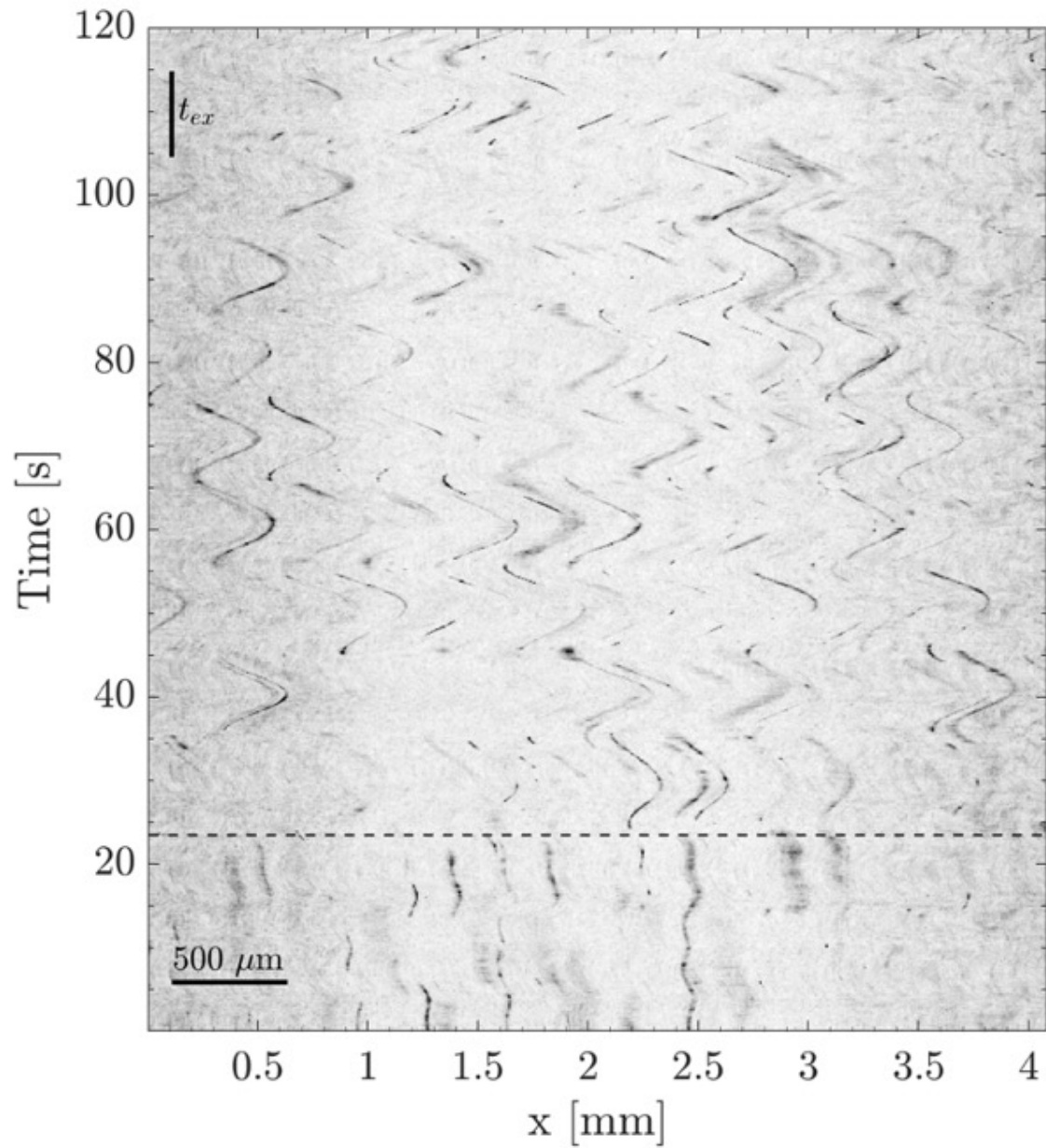


Periodic

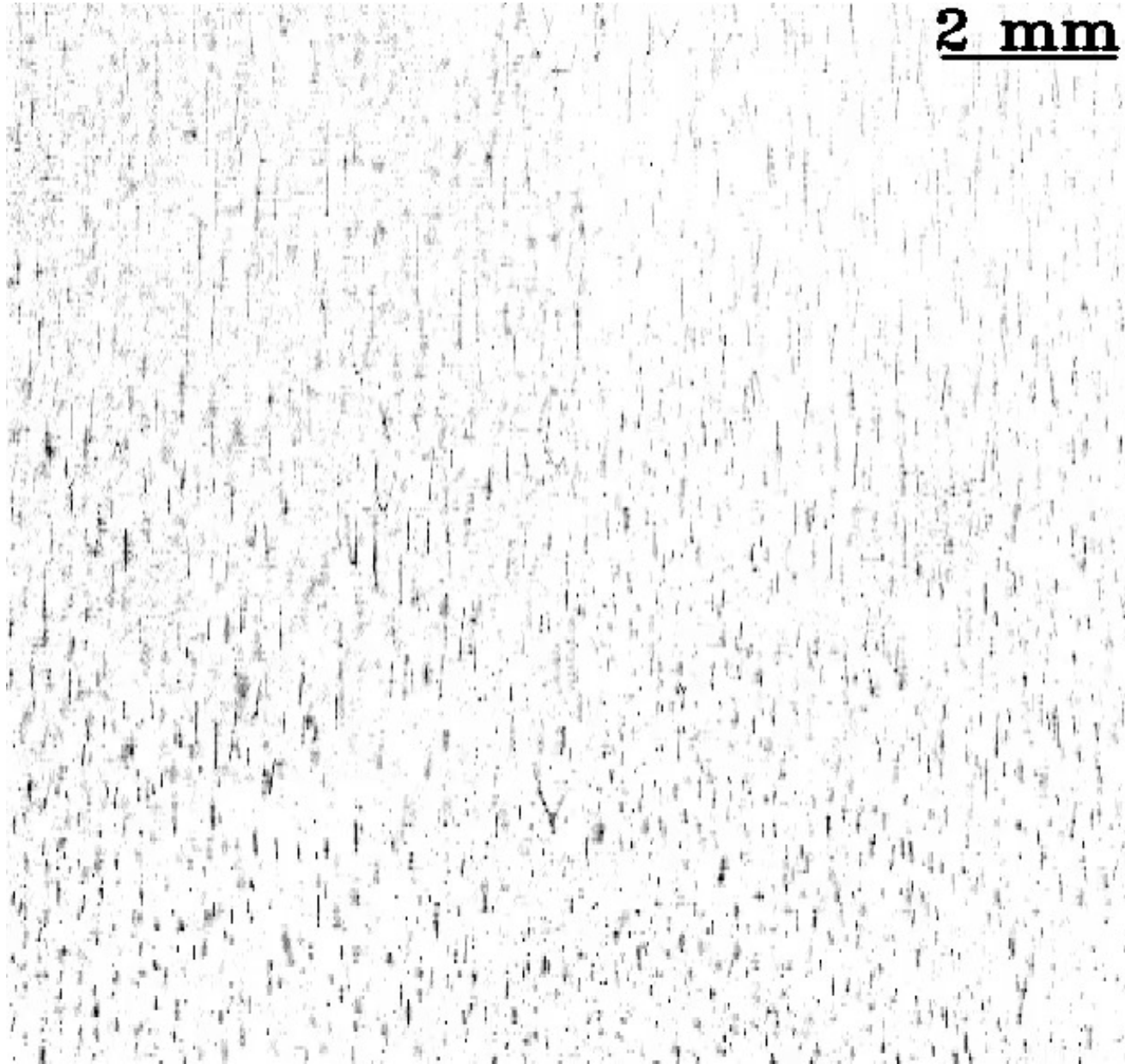


Transient

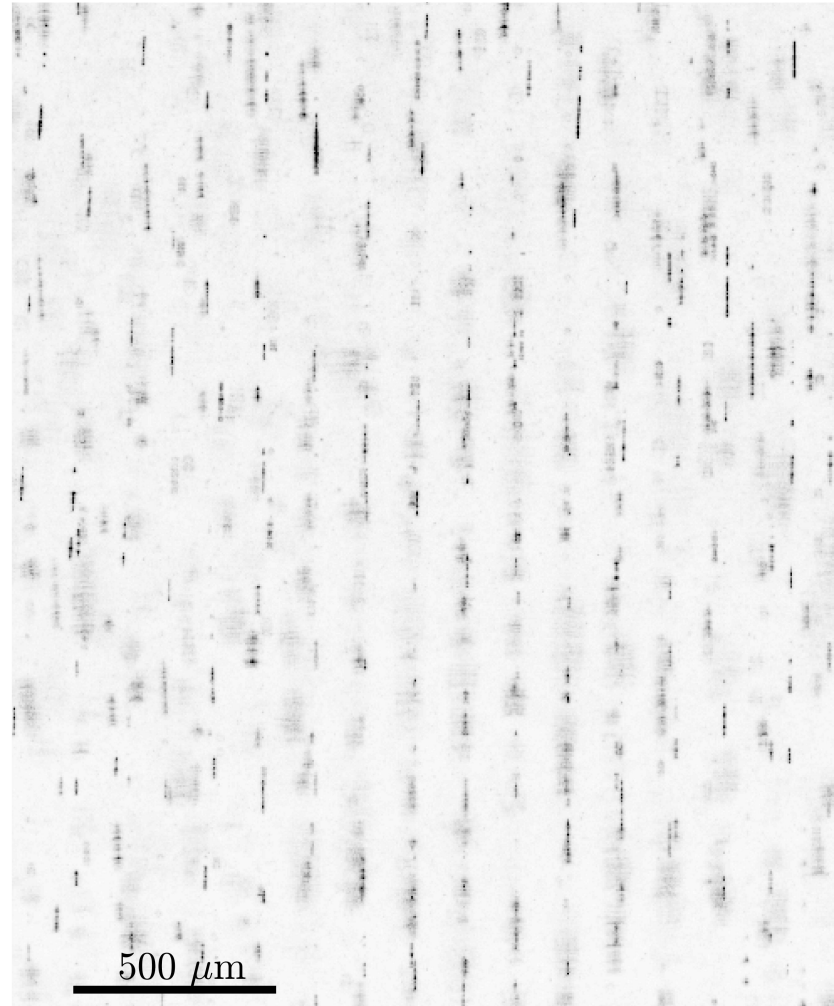
PERSPECTIVES



PERSPECTIVES



THANK YOU!



Perfect initial condition for dynamical studies