Kosterlitz-Thouless transition

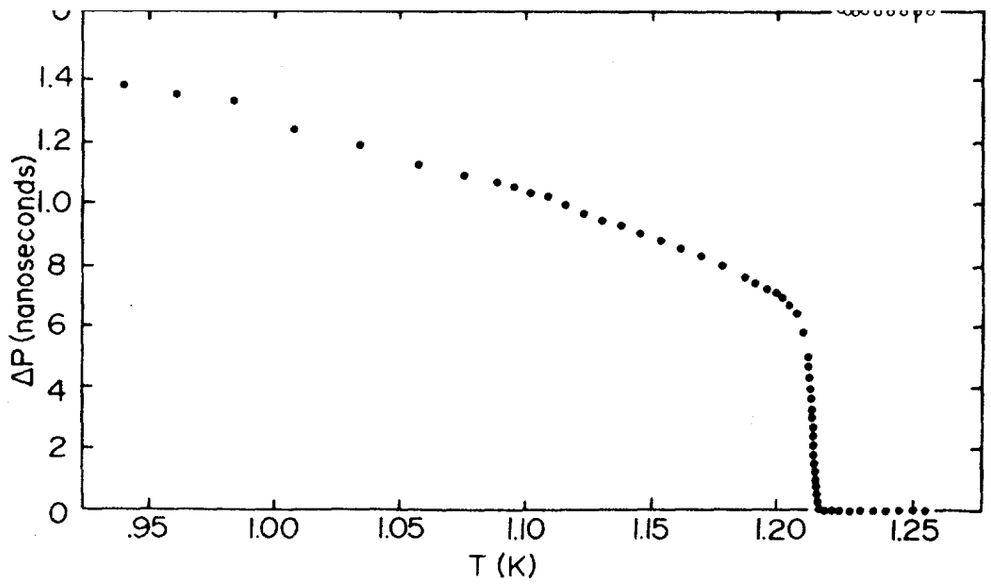

FIG. 1. The shift in period, ΔP, and dissipation Q^{-1} are shown as a function of temperature at the superfluid transition.

Bishop, Reppy
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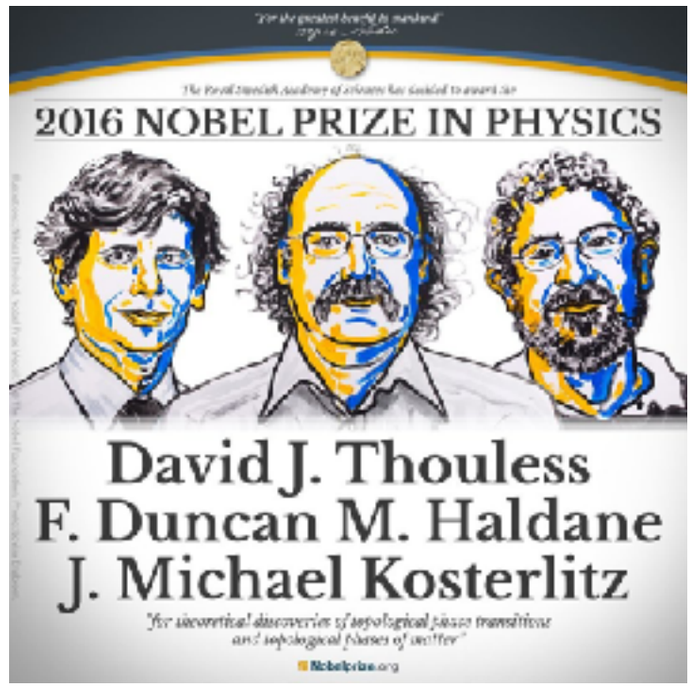


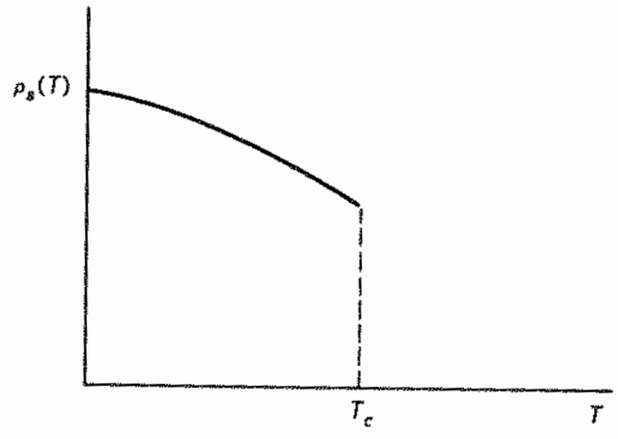


Fig. 11.4.1 Behavior of the superfluid density with temperature. Note the discontinuity at $T = T_c$.

Chester, Yang, Stephens,
Phys. Rev. Letters 29, 211 (1972)

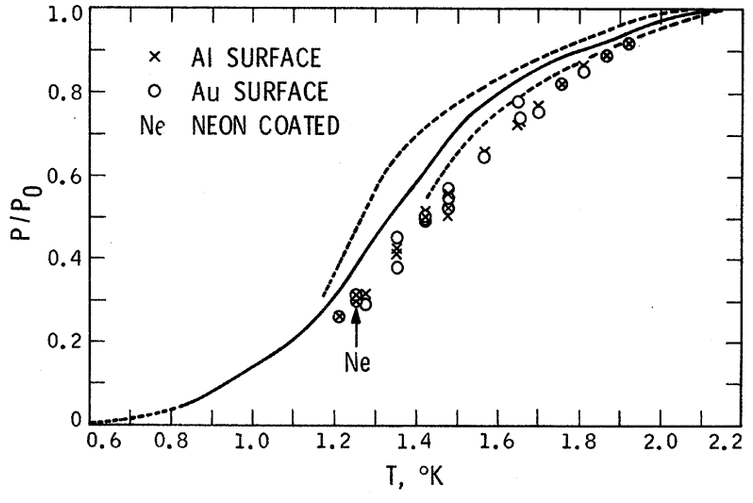
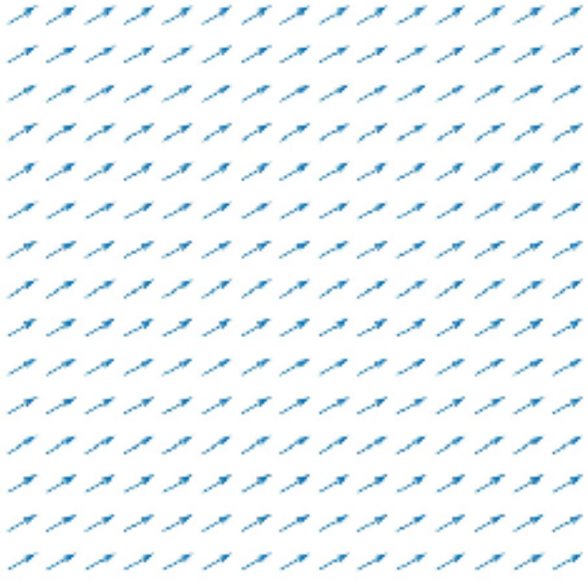


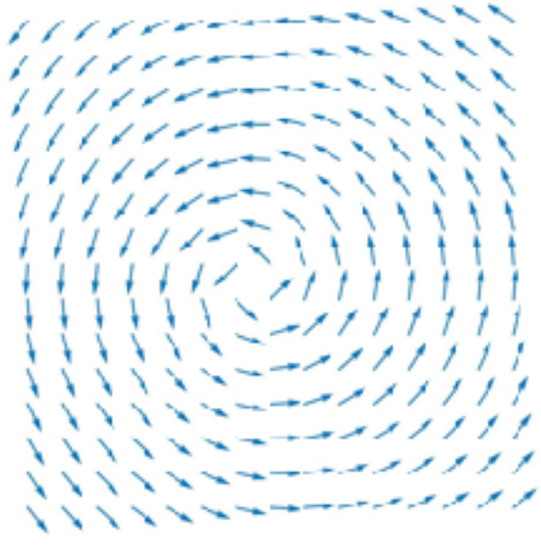
FIG. 3. Onset of superfluidity as a function of temperature. The points shown represent our results for three different substrates. (The point marked "Ne" was was obtained with neon substrates over the Au and Al electrodes.) The dashed curve represents the limits between which past reported results lie. (Cf. Fig. 18 of Ref. 5.)

Kosterlitz-Thouless phase transitions

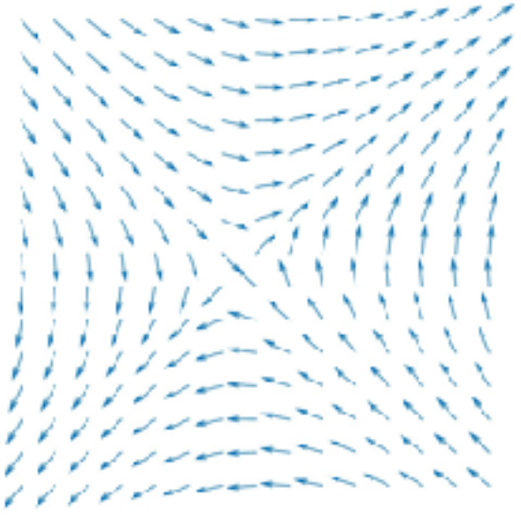
uniform state



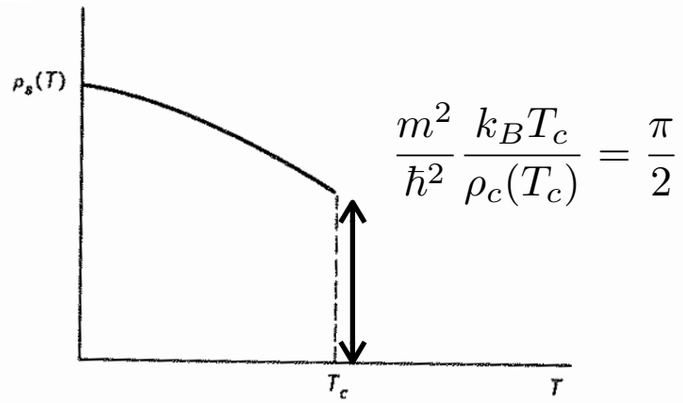
vortex



anti-vortex



vortex-antivortex pair



$$\frac{m^2}{\hbar^2}\frac{k_B T_c}{\rho_c(T_c)} = \frac{\pi}{2}$$

Fig. 11.4.1 Behavior of the superfluid density with temperature. Note the discontinuity at $T = T_c$.

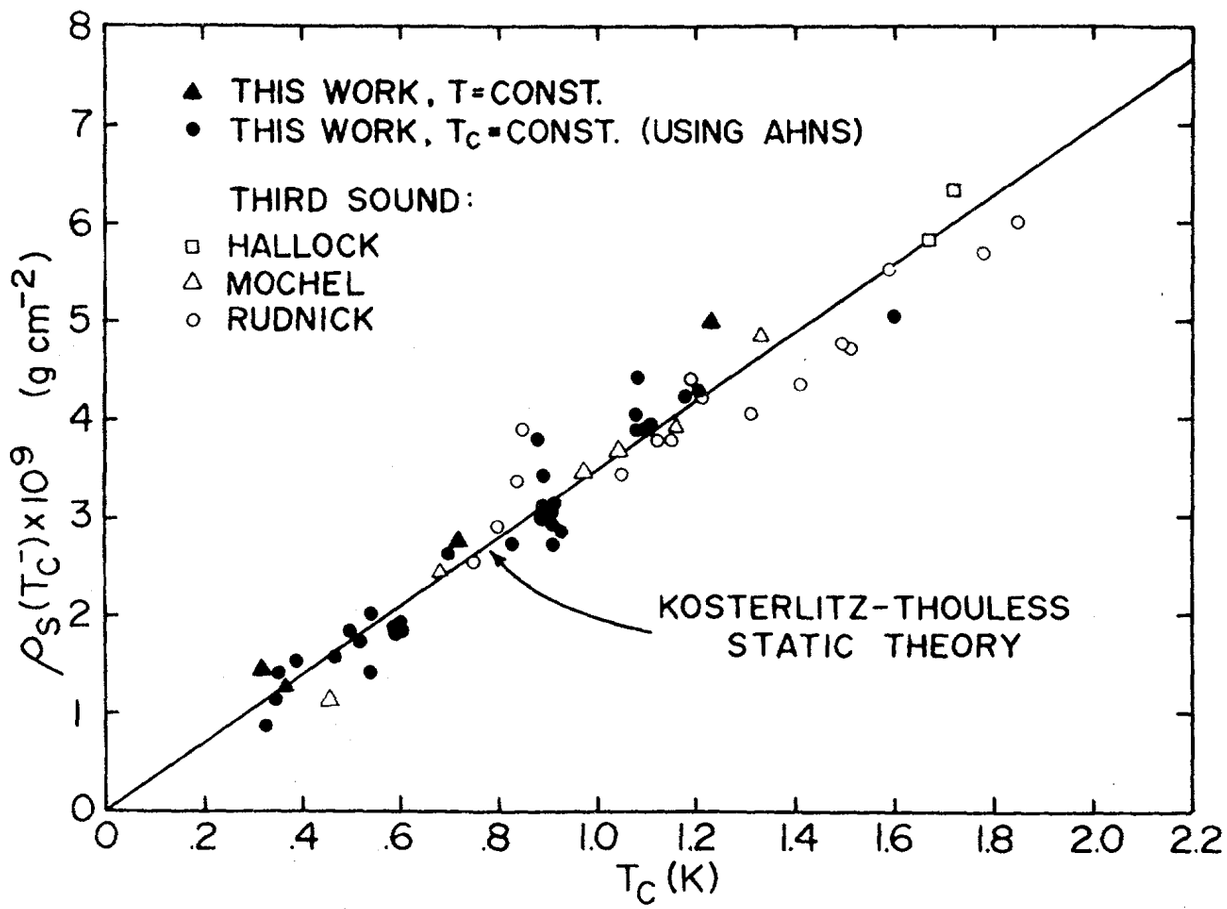


FIG. 3. Results of all of our data, in addition to previous third-sound results for the discontinuous superfluid density jump $\rho_s(T_c^-)$ as a function of temperature. The solid line is the Kosterlitz-Thouless (Refs. 3 and 4) static theory.

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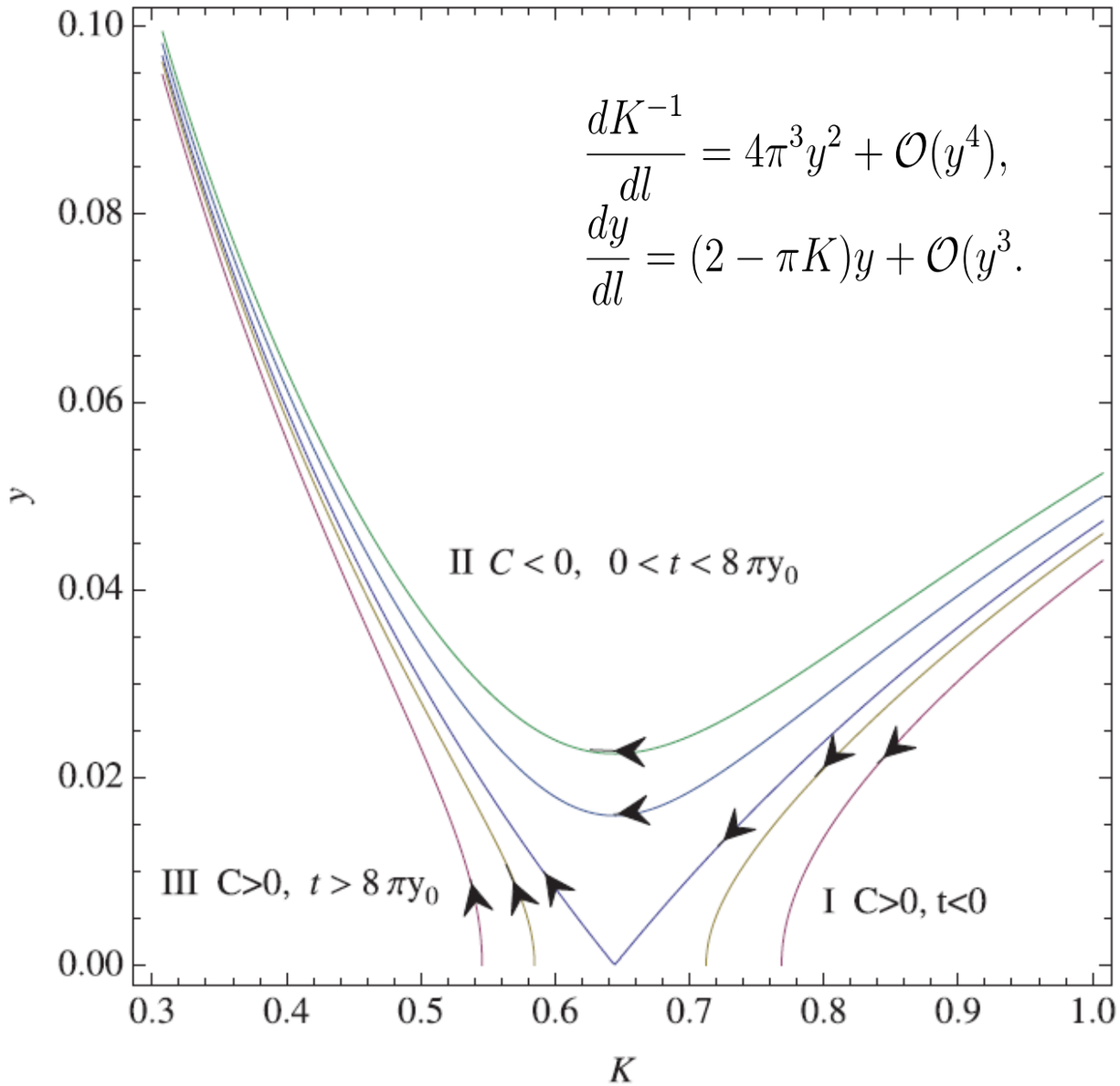
RG flow


$\frac{dK^{-1}}{dl} = 4\pi^3 y^2 + \mathcal{O}(y^4),$
$\frac{dy}{dl} = (2 - \pi K)y + \mathcal{O}(y^3.$
II $C < 0$, $0 < t < 8\pi y_0$
III C>0, $t > 8\pi y_0$
I C>0, t<0
0.10
0.08
0.06
0.04
0.02
0.00
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
y
K