Avenel and Varoquaux Reply: Now that isolated phase-slip events can be studied in the laboratory, it is appropriate that specific models describing quantized dissipation be developed and compared critically to experiment. In the preceding Comment[1] and in a previous Letter,[2] Schwarz suggests to ascribe these dissipation events to capture and release processes of vortex filaments from pinning sites on the walls of the micro-orifice which restricts the superflow. This model for a phase slip is a welcome microscopic description of the discrete dissipation events that take place in pure superfluid flow in the vicinity of $T=0$. The underlying assumptions are that (1) there exists a large number of suitable pinning sites on the orifice walls, (2) these sites are populated by a large number of metastable vortices, presumably created during the crossing of the λ transition, and (3) some of these vortices may, under the influence of the flow, hop from one site to another and at the same time release the energy they gather from the main potential stream. These assumptions have been shown to be consistent with one another by direct numerical simulations of vortex motion in a *long channel.*[2] It may thus be expected that, in some experimental contexts, the vortex-depinning mechanism proposed by Schwarz will be encountered.

The question which arises here is whether such a mechanism is plausible in the case of the *short orifice* used by us.[3] If we admit the first two assumptions for the moment, the third one can be seen to require an unplausibly large mean value of the friction force of the vortex on the wall. The energy to be dissipated per event is measured to be $\Delta E = 1.2\times10^{-17}$ J. If we imagine that the vortex filament is constrained to cross the slit along the largest possible dimension, which is the breadth $b=5$ μm, the force responsible for the dissipation is of the order of $\Delta E/2b = 1.2\times10^{-12}$ N. Forces of such a magnitude are strong enough to break the vortex filament apart and have been observed only on very rough substrates.[4] It appears to us unlikely that our substrate, although quite irregular, would present a dense array of the strongest possible pinning sites. Thus, we are led to question assumption 1. In addition, we note that, once depinned, the free-moving vortices flow downstream and quickly spool off the lips of the orifice. They do not shrink back to corners located upstream but vanish into the walls or in the bulk of the fluid. The supply of preexisting vortices will eventually exhaust itself, in conflict with assumption 2.

The preceding Comment goes one step further and shows how the vortex-depinning process can be thermally assisted to yield the temperature dependence of v_s which varies as $1-T/T_0$ with $T_0=2.46$ K. Such a striking dependence has been observed in two different experimental setups from 5 mK to 1.2 K at Orsay[5] and from 400 mK to 1.9 K at the University of Minnesota[6] with the same value of T_0. If the value of T_0 were indeed directly linked to the geometry of the pinning site as suggested in Ref. 1, it would be a rare coincidence that independent measurements give identical results. Furthermore, the vortex-depinning expression for T_0 also exhibits a dependence on the superfluid density ρ_s, a quantity which varies with temperature and pressure. None of these two dependences is seen experimentally[5,6]: It is particularly worthy of notice that the linear temperature law for v_s extends from the lowest temperatures up to 1.9 K, a fact which remains unexplained. The pinning of vortices, as stressed by Schwarz, is an important process to be reckoned with in superfluid hydrodynamics and we hope to present shortly experimental evidence for the presence of such a pinned, metastable vorticity in our Helmholtz resonator. However, we do not think that this process plays a role in phase-slip events.

Olivier Avenel
Service de Physique du Solide et de Résonance Magnétique
Centre d'Etudes Nucléaires de Saclay
91191 Gif-sur-Yvette Cedex, France

Eric Varoquaux
Laboratoire de Physique des Solides
Université Paris-Sud
91405 Orsay Cedex, France

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