Nazarenko Replies: The condition $k \gg c_s/\Gamma$ is identical to condition (13) of my Letter, $2\Gamma k_\infty^2 r_\perp/\pi c_s \gg 1$ in the 2D case considered by Sonin [1], because, according to (8), the typical $r_\perp$ for the spiraling rays is of order $2\Gamma/\pi c_s$ in this case. Therefore Sonin's statement that his condition is more restrictive than (13) is wrong. I would like the reader to not be confused by the quantum terminology, such as the uncertainty ("indeterminancy") principle, Sonin is applying it to a completely classical system that I am considering, i.e., Euler equations in the geometrical acoustics approximation.

The summarizing statement of Sonin is that he does not know any medium to which "the theory of Nazarenko" may be applied. My remark is that the medium of which Sonin is not aware here is the air. Ray acoustics has been used for the description of the sound propagation in vortex flows in aerodynamics since Rayleigh [2]. The acoustic rays in the field of a point vortex were considered in Refs. [2–4]. The spiraling rays were first obtained by Salant [3]. My humble contribution was to generalize these solutions to the 3D case. The condition $k \gg c_s/\Gamma$ is easily satisfied for a wide variety of vortical flows. For example, the typical Γ for vortices behind aircrafts is 100 m^2/sec, so that $k \gg c_s/\Gamma$ for frequencies $\gg$150 Hz. Most of the literature cited in the Letter deals with the vortex-acoustic interactions in air, and it was air and gases with similar hydrodynamical properties that were meant by "compressible turbulent fluids" when the main object of the Letter was discussed.

Now about superfluids. The careful reader may have noticed that the possibility to explain the second sound attenuation by vortices was mentioned in the Letter only as a hypothesis. It was explicitly stated that the absorption effect found has to be examined in a more appropriate ^{4}He model. There is no guarantee that in a more realistic model the spiraling effect will persist or be effective. Ray acoustics is not applicable to ^{4}He; this is true. Nevertheless, this cannot be among the real reasons precluding the spiraling effect as Sonin claims. Here is the proof.

(1) The linearized equation for the velocity potential ϕ of an *arbitrary* potential perturbation in the field of a straight vortex filament is a linear hyperbolic PDE. For example, in the case of the isothermal Euler equations we have

$$\frac{1}{T}\left(\partial_t - \frac{\Gamma}{2\pi r^2}\partial_\theta\right)^2 \phi = \left(\frac{\Gamma^2}{4\pi^2 T r^3} + \frac{1}{r}\right)\phi_r + \phi_{rr} + \phi_{\theta\theta}/r^2 + \phi_{zz},$$

where T is the temperature and (r, θ, z) are the polar coordinates.

(2) The initial data for linear hyperbolic PDE's propagate along the characteristics.

(3) The characteristics for the linear hyperbolic PDE's are closely related to the rays. The family of characteristics originating at some point $\mathbf{r_0}$ in space have to be obtained by solving the ray equations (1) and (2) with initial $\mathbf{r} = \mathbf{r_0}, |\mathbf{k}| = 1$ and all possible initial orientations α of $\mathbf{k}$. For any α the solution $\mathbf{r} = \mathbf{r}_\alpha(t)$ defines a characteristic curve. The family of curves $\mathbf{r} = \mathbf{r}_\alpha(t)$ for all possible values of α defines the characteristic cone in $(\mathbf{r}, t)$ space with the vertex at $\mathbf{r} = \mathbf{r_0}$.

(4) The rays are shown in the Letter to spiral onto the vortex in finite time if (8) is satisfied. Thus for any $\mathbf{r_0}$ there exists a range of α for which the characteristics $\mathbf{r} = \mathbf{r}_\alpha(t)$ spiral onto the vortex. The correspondent (finite) sector of the characteristic cone will terminate on the vortex line for finite t, and all the initial data propagating along the characteristics in this sector will be absorbed.

Thus the physical picture described in the beginning of the Letter, i.e., that the acoustic fronts are strongly distorted in the regions of the strong convection and get "wrapped" onto the vortex, is valid for any wavelength of sound.

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