Thoul, Similon, and Sudan Reply: We welcome this opportunity to clarify the methodology of our work[1] in answer to the Comment by Terry, Diamond, and Hahm (TDH). We should first reemphasize that the way we study turbulent transport is distinct from the more conventional approach. Instead of evaluating the *equilibrium flux* (or equivalently the collision operator), we look at the infinitesimal *flux increment* (or equivalently the *perturbed* collision operator) due to a small change in density or temperature gradient.

The main question raised by TDH is whether the infinitesimal response of the system describes the drag terms which have been the object of their work.[2] Obviously, the relaxation of the perturbation, and thus the exact average response, must include such effects, even though the latter is a "coherent" object according to their terminology. It is a less trivial point to establish that approximations preserve that property, but the direct-interaction approximation (DIA) which we have been using in our work satisfies that requirement. For instance, it has been shown[3] that the DIA response function for the Balescu-Lenard operator properly contains the drag. Here we prove this point for a model which admits a nonlinear Fokker-Planck collision operator entirely analogous to the Balescu-Lenard operator. Consider the stochastic equation

$$\partial f/\partial t+\mathbf{v}_a\cdot\nabla f=0, \tag{1}$$

where α is a random variable with short correlation time τ, $\mathbf{v}_a(\mathbf{x},[\langle f\rangle])$ is a member of an ensemble of flows and a functional of $\langle f\rangle$, and the angular brackets denote an average over α. Then $\langle f\rangle$ obeys the Fokker-Planck equation:

$$\partial\langle f\rangle/\partial t=\nabla\cdot[\mathbf{D}\cdot\nabla\langle f\rangle-\mathbf{B}\langle f\rangle], \tag{2}$$

where the diffusivity tensor $\mathbf{D}[\langle f\rangle]=(\tau/2)\langle\mathbf{v}_a\mathbf{v}_a\rangle$ and the drag $\mathbf{B}[\langle f\rangle]=\langle\mathbf{v}_a\rangle$ are functionals of $\langle\delta f\rangle$. If we apply the DIA to Eq. (1), exactly as has been done in Ref. 1, we find that the response $\langle\delta f\rangle$ to the perturbation $\delta\xi$ obeys

$$\partial\langle\delta f\rangle/\partial t=\delta\xi+\nabla\cdot[\langle\mathbf{v}_aG\delta\mathbf{v}_a\rangle\cdot\nabla\langle f\rangle+\langle\delta\mathbf{v}_aG\mathbf{v}_a\rangle\cdot\nabla\langle f\rangle+\langle\mathbf{v}_aG\mathbf{v}_a\rangle\cdot\nabla\langle\delta f\rangle-\langle\delta\mathbf{v}_a\rangle\langle f\rangle-\langle\mathbf{v}_a\rangle\langle\delta f\rangle],$$

where G is the renormalized propagator $(\partial/\partial t)^{-1}$, and where $\langle\delta\mathbf{v}_a\rangle$ is linear in $\langle\delta f\rangle$. This is precisely the linear perturbation of Eq. (2), and includes in particular the (perturbed) drag terms. In clump theories,[2,4] the consideration of "incoherent fluctuations" is necessary to recover, at least partly,[5] certain correlations which are neglected in the quasilinear theory. The equivalent correlations are already included in the DIA response function.

In their Comment, TDH outline a "single-blob" analysis from which they conclude that no transport occurs, even in the presence of a temperature gradient. However, they have overlooked the fact that both $\tilde{f}$ and $\langle f\rangle$ depend on $v_\perp^2$ (see, e.g., the decomposition of $\tilde{h}$ into $\tilde{p}$ and $\tilde{q}$ in Ref. 1). Taking this property into account leads instead to a heat-transport coefficient of the order of the test-particle diffusion coefficient.

To conclude, our method offers reliable and systematic estimates of transport coefficients. The response function can indeed, contrary to TDH's claim, be used to describe stationary turbulence, which requires only stationary correlation functions but allows decaying response function. Our conclusion, that low-frequency magnetic fluttering creates electron heat transport, is unaltered. In the presence of temperature gradients, it is found to be of the order of the test-particle diffusion coefficient. We have performed detailed estimates of both resonant and thermal electron contributions to heat transport, to appear in a forthcoming paper.

We thank J. A. Krommes for an interesting discussion pertaining to this subject.

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Received 22 December 1987
PACS numbers: 52.35.Ra, 47.25.Jn, 52.35.Kt, 52.35.Qz

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