Krstulovic and Brachet Reply: In the preceding Comment [1], Kozik raised a criticism against the bottleneck proposed in our Letter [2] causing a thermalization delay when dispersive effects, controlled by the coherence length ξ, are large at truncation wave number: $k_{\max}$. The late-time energy spectrum presents a front at wave number $k_c(t)$ propagating toward higher wave numbers and leaving in its wake a quasithermalized distribution. Kozik argues that our observations agree with the relaxation scenario, developed by Svistunov [3], that involves no bottleneck and predicts $k_c(t) \sim t^{1/4}$.

Indeed, it is apparent in Fig. 1 [where $k_c(t) \sim t^{\alpha}$ corresponds to a line of slope $(\alpha - 1)/\alpha$] that four out of eleven runs (vi, vii, viii, and xii) are somewhat compatible with the Svistunov prediction. However, the prediction works only in the limited range $0.4 < k_c/k_{\max} < 0.8$ where run xi, with Taylor-Green initial data and $\xi k_{\max} \sim 6$, yields a slope of -2.4. Runs vi, vii, and viii, with initial data prepared using the stochastic Ginzburg-Landau equation and $\xi k_{\max} \sim 6$, have slopes closer to the Svistunov prediction of -3. Runs that saturate with $k_c/k_{\max} \sim 1$ are reaching (truncated) thermal equilibrium and are not spectrally well converged. In contrast, runs i–iv, with $\xi k_{\max} \sim 24$, saturate at $k_c/k_{\max} < 0.4$ and are well converged but the data suggest a logarithmic growth of $k_c(t)$ (vertical line on Fig. 1), a behavior very different from that predicted in [3].

This discrepancy is perhaps due to the fact that Svistunov considers a two-stage process: first a condensation produced by a particle-flux wave propagating to low energies and then a wave propagating from the low to high energy region. It is not absolutely clear that the initial conditions of our Letter [2] really correspond to any of the stages considered by Svistunov [see the discussion following Eq. (4.7) of [3]].

Concerning the criticism against our use of the word "bottleneck," we believe it is related to a limitation in Svistunov theory. Indeed, it is well known that Bogoliubov's dispersion relation $\omega_B(k) = kc(1 + k^2\xi^2/2)^{1/2}$ (where c is the sound velocity) implies (around wave number $k \sim 1/\xi$) a change from propagative to dispersive behavior. This elementary point is not completely addressed in Svistunov theory, in particular, at the level of the kinetic equations 3.10–3.13 of [3] and Eq. (1) of [1,4]. Thus Svitunov's analysis is applicable only for wave numbers $k \gg 1/\xi$. This limitation does not allow one to appreciate the importance of ξ and to grasp that $k\xi$ (in particular $\xi k_{\max}$) is an important dimensionless parameter in this problem leading to a crossover between different regimes [see Fig. 1 and also Figs. 7(b) and 7(c) of [6]].

In a physical BEC, $k_{\max}$ correspond to the equipartition wave number k_{eq} (see [2] and Sec. IV of [6]). Sinatra and Castin [7] have shown that the slowdown of thermalization reported in [2] can be related to the behavior of the

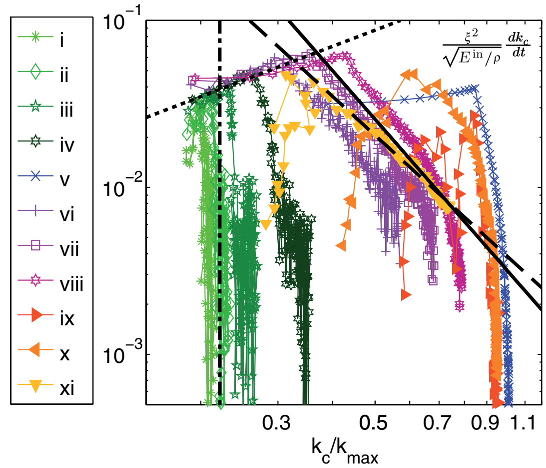

FIG. 1 (color online). Parametric representation dk_c/dt vs $k_c/k_{\max}$ [adapted from Fig. 4(e) of [2]]. Different scaling laws are displayed. Svistunov prediction: solid line $(k_c/k_{\max})^{-3}$; fit to run xi: large dashed line $(k_c/k_{\max})^{-2.4}$; dotted line $(k_c/k_{\max})^{1}$ and dot-dashed line $(k_c/k_{\max})^{-\infty}$.

(classical) damping rate around equilibrium that reaches a maximum around $k\xi \sim 3$ and decays for $k\xi \gg 1$. They have established that, at fixed $k\xi$ well beyond its maximum, the (quantum) Beliaev-Landau damping rate approaches the classical one provided $k_B T/|\hat{\psi}_0|^2 g > 200$ which could be achieve experimentally using Feshbach resonance.

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