Schechter *et al.* Reply: In the preceding Comment [1] Eckern *et al.* criticize the results obtained in our Letter [2]. Their main criticism is that the BCS model cannot give reliable answers to describe the experiments on persistent currents in metallic rings. They then explain in length that the BCS result can be obtained from the $q = 0$ component of the calculation of Ambegaokar and Eckern in Ref. [3]. We address this main part of the Comment first, and then consider the other physical points raised in the last paragraph of the comment and the sentence preceding it.

In our Letter [2] we calculate the magnetic response within the BCS model, and obtain a result which is parametrically larger than the result obtained using the local interaction model [3]. Our Letter [2] clearly explains that the BCS model can not give reliable answers to describe the experiments of persistent currents in metallic rings. Our main point [2] was that a possible dependence of the phonon-induced electron-electron (e-e) interaction on the total momentum of the incoming particles q would have a strong effect on the magnetic response in metallic rings. This was demonstrated using the reduced BCS Hamiltonian.

Indeed, as is explained in the Letter [2] and repeated in the Comment [1], the difference between the BCS model and the local interaction model is in their effective q dependence, i.e., the BCS model assumes interaction only for $q = 0$. This led us to conclude [2]: "This makes the q independent assumption for the bare interaction crucial. The existence of excess interaction at small total momentum q would thus significantly affect the result. The BCS interaction assumes just that, the existence of excess interaction at $q = 0$."

Let us now address the other points raised in Ref. [1]:

(a) The question of periodicity: Being interested in the magnetic response itself (at small flux), we *did not* address the question of periodicity. If desired, this can be easily taken care of by considering any $V(\tilde{q})$ where $\tilde{q} \equiv q - 2\pi L\Phi/\Phi_0$. For example, an interaction which is constant for $|\tilde{q}| < q_0$ and zero otherwise is equivalent (for $q_0 < 2\pi/L$) to the BCS model in the limit of $\Phi \rightarrow 0$, which we considered in our Letter [2], and is periodic.

(b) In the last part of the Comment [1] it is mentioned that taking a q dependent interaction one would also have contribution to the magnetic response resulting from the second derivative of the interaction constant with respect to flux at zero flux. This is in general correct, and would result, for any attractive interaction which is stronger at small q, in further enhancement of the magnetic response due to the q dependence of the interaction, strengthening our argument. Note, moreover, that for the q dependence given in (a) above, as well as for the q dependence that arises from the phase space argument given in our Letter [2] (beginning of the right column of page 3; also see for details Ref. [4]), no such effect exists since the second derivative with respect to flux is zero in the former and has $(\omega_D/E_F)^2$ smallness in the latter.

(c) Last, the statement of the Comment that the explicit dependence of the interaction is on the momentum transfer and has the scale of p_F and not ω_D/v_F is trivial, and since this dependence is small it is neglected both in Ref. [3] and in our Letter [2]. However, the claim in the Letter [2] is that retardation effects may lead to *effective q* dependence due to phase space restrictions.

Ever since it was understood [5] that the results, seemingly in agreement with experiment [3] are actually overestimated due to the neglect of the known higher orders logarithmic correction [6], the discrepancy between theory and the experimental results [7–10] remains an open question. In our Letter we show that an effective q dependence of the attractive phonon mediated interaction would significantly increase the theoretical value of the magnetic response. Such possible q dependence is motivated by phase space arguments [2,4]. We think that the question of whether a realistic model for the phonon-induced attractive $e - e$ interaction has an effective dependence on the total momentum of the incoming particles q, and its detailed consequences for the problem of persistent current is worthy of further study.

Moshe Schechter
University of British Columbia
Vancouver, British Columbia, Canada V6T 1Z1

Yuval Oreg, Yoseph Imry, and Yehoshua Levinson
The Weizmann Institute of Science
Rehovot 76100, Israel

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