Qiu and Gao Reply: In the preceding Comment [1], Kuntsevich and Pudalov (KP) first make a groundless assertion that the physics in the low magnetic field (B) reentrant insulating phase (RIP) and the Wigner solid (WS)-liquid transition in our study of clean p-GaAs quantum wells (QWs) [2] is the same as in earlier work on Si devices [3–5] without giving any comparison between them. Indeed, disorder pinned WS or RIP in silicon at filling factor $\nu > 1$ was well studied in Refs. [3–5], which were unfortunately missed in Ref. [2]. However, there has never been any report of RIP at $\nu > 1$ in GaAs until Ref. [2]. In Si, the WS-liquid transition happens at $r_s \sim 10$ and the phase boundary shows multiple oscillations at high ν [3–5], differing drastically from the theoretical prediction in the clean limit [6] and were understood as due to disorder and valley degeneracy [3–5]. However, in our work [2], the transition happens at $r_s \sim 37$ with a phase diagram confirming the theory [6]. These facts suggest the more dominant role of interaction over disorder in our system. In fact, if it were the same physics, the RIP at $\nu > 1$ would have been seen in numerous prior studies in GaAs with similar or higher r_s values than that of Si. We would not jump to the conclusion that the same physics happens in these systems residing in different regimes of disorder and interaction strength. Another point of Ref. [2] was to elucidate the controversial origin of the $B = 0$ metal-insulator transition [7,8]. Before our work, all the experimental work in GaAs showed a direct transition from the $B = 0$ insulator to the $\nu = 1$ quantum Hall state [9], resembling conventional Anderson insulator to QH transition. Reference [2] shows that we now have a two-dimensional (2D) system (clean p-GaAs QW with narrow width) hosting the WS-liquid transition approaching the clean limit.

Mistakenly assuming the same process happens in the capacitance experiments on Silicon metal-oxide-semiconductor field-effect transistors [3,4] and our delta-doped GaAs-QWs in which the neutralizing charges are not on gate but fixed on ionized dopants, KP then criticize us for attributing the large drop in the measured capacitance (C) to the incompressibility of a WS [2]. First, we have validated the capacitance drop in Ref. [2] through an analysis of the phase shift of charging current and the frequency dependence of C (Supplemental Material [10]). The comparison between our data and the distributed RC network model [11,12] shows the low-frequency C measurement in Ref. [2] being in the frequency-independent regime. The small phase shift of charging current (Supplemental Material [10]) allows an estimate of the error in C to be within 1% for the lowest hole density displaying up to 50% capacitance drop in the RIP (Fig. 2 of Ref. [2]). These facts exclude the resistive and slow charging explanations suggested by KP. We also note that the resistance measurement in Ref. [2] was done with voltage on sample approaching the μV range, avoiding the threshold I-V [3,4,13] or heating effects [14].

KP finally resort to explain the reduced C value as due to parts of sample being fully depleted since the compressibility of WS is finite and negative in typical capacitance experiments [15,16]. KP's understanding of WS's compressibility applies to Silicon metal-oxide-semiconductor field-effect transistors [3,4] in which the neutralizing charges reside on gate and are adjustable [15,16]. But in our sample, all the neutralizing charges are fixed on remotely ionized dopants. To induce a RIP (or WS), the gate voltage shifts a small amount ($\sim 1/3$ in the worst case scenario in Ref. [2] for $p = 0.86$) of holes from the QW to gate. Since the energy in the neutralizing dopants and gate is either constant or much smaller than the 2D system itself, our capacitance experiment approximates the charging of a single-layer 2D WS that is indeed incompressible [15,16]. When estimating the chemical potential difference $\Delta\mu$ between two points in the phase diagram as the 2D system charges up, one should multiply the energy of the WS itself ($\sim r_s E_F \sim 2$ meV per particle) [17] with the particle density difference and expect a large $\Delta\mu$ in the range of several meV, consistent with our capacitance data. Indeed, a single-layer WS is incompressible because of the large energy required to charge up the system [15,16]. KP inappropriately compare $\Delta\mu$ to E_F, $\hbar\omega_c$ or the energy difference between a WS and a liquid without considering the charging effect. In retrospect, Ref. [2] was the first experiment demonstrating the theoretically expected incompressible nature of a *single-layer* 2D WS. We do not exclude void formation or nonlinear screening as the explanation for other doped GaAs systems with stronger disorder or lower r_s in which the low B WS was *not* observed [18,19].

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