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Observation of Anisotropic Stripe Phases at Even Denominator Fillings $\nu = 3/2, 5/2$ and $7/2$ in a Narrow AlAs Quantum Well¹ MD. SHAFAYAT HOSSAIN, M. A. MUEED, MENG K. MA, YOON JANG CHUNG, L. N. PFEIFFER, K. W. WEST, K. W. BALDWIN, M. SHAYEGAN, Princeton University — Anisotropic stripe phases are observed at high-index, half-filled Landau levels in high quality 2D carrier systems with high mobility. Here, we report the observation of such phases at filling factors $\nu = 3/2, 5/2$ and $7/2$ under tilted magnetic field in a narrow (56.6 Å-wide) AlAs quantum well where electrons occupy an out of plane (Z) valley with a density of $3 \times 10^{11} \text{ cm}^{-2}$ and a modest mobility of about $7 \text{ m}^2/\text{Vs}$. At a critical tilting angle, when $\nu = 3/2$ undergoes a transition from the $N=0$ ($Z0\uparrow$) to the $N=1$ ($Z1\downarrow$) Landau level, a resistance spike emerges, indicating a ferromagnetic transition. For higher tilting angles, the ground state at $\nu = 3/2$ develops into a stripe phase with the resistance along B_{\parallel} exhibiting a minimum whose value is about 6 times smaller (in a Hall-bar geometry) than the resistance perpendicular to B_{\parallel} which shows a maximum. Similar phenomenon happens for $\nu = 5/2$ and $7/2$, when they undergo transitions from $Z0\uparrow$ to $Z2\downarrow$ and $Z0\uparrow$ to $Z3\downarrow$, respectively, at yet higher tilt angles. Furthermore, the anisotropic phases appear to be quite robust as they persist even at 1.8 K.

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