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Directional mode-locking of driven two-dimensional active magnetized colloids with periodic pinning centers

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Highlights

(1) We investigate the directional mode-locking of driven two-dimensional active magnetized colloids on a substrate with periodically distributed point-like pinning centers.

(2) The movements of the depinning colloidal particles are found to be locked collectively in some symmetric directions of the substrate pinning potential.

(3) There form directional mode-locking steps in the driving force direction dependence of the average velocity of colloidal particles.

(4) The deviations of some colloidal particles from the mode-locking directions are also observed clearly.

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