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Colloidal diffusion over a periodic energy landscape XIAO-GUANG MA, Hong Kong University of Science and Technology, PIK-YIN LAI, National Central University, Taiwan, PENGER TONG, Hong Kong University of Science and Technology — A two-layer colloidal system is developed for the study of colloidal diffusion over a two-dimensional periodic energy landscape. The energy landscape is made from the bottom layer of colloidal spheres forming a honey-comb crystalline pattern above a glass substrate. The corrugated surface of the bottom colloidal crystal provides a gravitational potential field for the diffusing particles in the top layer. The obtained population probability histogram $P(x, y)$ of the diffusing particles is used to fully characterize the energy landscape $U(x, y)$ via the Boltzmann distribution. The dynamical properties of the diffusing particle, such as its escape time t_R and diffusion coefficient D are simultaneously measured from the particle's trajectories. The long-time diffusion coefficients D is found to be in good agreement with the theory for all colloidal samples studied. The experiment demonstrates the applications of this newly constructed colloidal energy landscape. *Work supported in part by the Research Grants Council of Hong Kong SAR.

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