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(sshrestha01@wesleyan.edu), 400 Washington Street, Apt C4, Middletown, CT 06457. *Periodic directions on the Mucube*. Preliminary report.

The dynamics of straight-line flows on compact translation surfaces (surfaces formed by gluing Euclidean polygons edge-to-edge via translations) has been widely studied due to connections to polygonal billiards and Teichmüller theory. However, much less is known regarding straight-line flows on non-compact infinite translation surfaces. In this talk we will review work on straight line flows on infinite translation surfaces and consider such a flow on (the translation cover of) the Mucube – an infinite  $\mathbb{Z}^3$  periodic half-translation square-tiled surface – first discovered by Coxeter and Petrie and more recently studied by Athreya-Lee. We will give a complete characterization of the periodic directions on the Mucube – in terms of a subgroup of  $SL(2, \mathbb{Z})$ . This is joint work (in progress) with Andre P. Oliveira, Felipe A. Ramírez and Chandrika Sadanand. (Received January 23, 2022)