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Alexander James Appleton* (aja44@berkeley.edu), Department of Mathematics, 951 Evans Hall, Suite 3840, Berkeley, CA 94720-3840. *Eguchi-Hanson singularities in $U(2)$ -invariant Ricci flow*. Preliminary report.

We show that a Ricci flow in four dimensions can develop singularities modeled on the Eguchi-Hanson space. In particular, we prove that starting from a class of asymptotically cylindrical $U(2)$ -invariant initial metrics on TS^2 , a Type II singularity modeled on the Eguchi-Hanson space develops in finite time. Furthermore we show that in our setup blow-up limits at larger scales are isometric to either (i) the flat $\mathbb{R}^4/\mathbb{Z}_2$ orbifold, (ii) a rotationally symmetric, positively curved, asymptotically cylindrical ancient orbifold Ricci flow on $\mathbb{R}^4/\mathbb{Z}_2$, or (iii) the shrinking soliton on $\mathbb{R} \times \mathbb{R}P^3$. As a byproduct of our work, we also prove the existence of a new family of Type II singularities caused by the collapse of a two-sphere of self-intersection $|k| \geq 3$. (Received January 24, 2019)