

$$\text{and } [B\mathbb{Z}/p, W]_* = [B\mathbb{Z}/p, \mathcal{S}^{\wedge 2} X]_{\mathbb{Z}/p \rightarrow 0} \leq [B\mathbb{Z}/p, \mathcal{S}^{\wedge 2} X]_*$$

$$0 = [\mathcal{S}^{\wedge 2} B\mathbb{Z}/p, X]_*$$

But!

$$W \rightarrow W_2 = K(\pi_2, \mathbb{Z}) \rightarrow K(\mathbb{Z}/p, \mathbb{Z})$$

$$\begin{array}{ccc} & \uparrow & \nearrow \\ & K(\mathbb{Z}/p, \mathbb{Z}) & \\ \uparrow & \leftarrow \neq 0 \in & \\ B\mathbb{Z}/p & & H^2(B\mathbb{Z}/p, \mathbb{Z}) \end{array}$$

$$\Rightarrow [B\mathbb{Z}/p, W]_* \neq 0.$$