

## Unprojection and deformations of tertiary Burniat surfaces

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**Abstract.** We construct a 4-dimensional family of surfaces of general type with  $p_g = 0$  and  $K^2 = 3$  and fundamental group  $\mathbb{Z}/2 \times Q_8$ , where  $Q_8$  is the quaternion group. The family constructed contains the Burniat surfaces with  $K^2 = 3$ . Additionally, we construct the universal coverings of the surfaces in our family as complete intersections on  $(\mathbb{P}^1)^4$  and we also give an action of  $\mathbb{Z}/2 \times Q_8$  on  $(\mathbb{P}^1)^4$  lifting the natural action on the surfaces.

The strategy is the following. We consider an étale  $(\mathbb{Z}/2)^3$ -cover  $T$  of a surface with  $p_g = 0$  and  $K^2 = 3$  and assume that it may be embedded in a Fano 3-fold  $V$ . We construct  $V$  by using the theory of parallel unprojection. Since  $V$  is an Enriques–Fano 3-fold, considering its Fano cover yields the simple description of the above universal covers.

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