Erratum to: Foliations associated to harmonic maps on some complex two ball quotients

Sai-Kee Yeung

Department of Mathematics, Purdue University, West Lafayette, IN 47907, USA
Email: yeung@math.purdue.edu

Citation: Yeung S-K. Erratum to: Foliations associated to harmonic maps on some complex two ball quotients. Sci China Math, 2020, 63: 1645, https://doi.org/10.1007/s11425-019-1710-6

In [Y, p. 1146, l. 35], it is stated that “$P_{\mathbb{R}}\#T^2$ has a two-fold cover that is $T^2$”. This is a mistake. As a result, [Y, Theorem 4.2] should be corrected as follows. The numbering of the references follows [Y].

**Theorem 4.2.** Let $M$ be a smooth complex surface of general type with $c_2(M) = 3$. Then $M$ is an arithmetic complex two ball quotient. Moreover, $M$ is either a fake projective plane or a Cartwright-Steger surface. Hence, there are altogether 101 such surfaces.

**Proof.** The surface $M$ has to be a complex two ball quotient $B^2_{\mathbb{C}}/\Gamma$ as explained in [31, Proposition 2.1], where $\Gamma$ is a cocompact lattice of $PU(2,1)$. The lattice $\Gamma$ is integral as explained in [Y, p. 1146]. An alternate proof is now available through the main result of [EG]. Arithmeticity of $\Gamma$ is a consequence of integrality together with Archimedean rigidity as explained in the first half of [Y, p. 1146], following [Y, Lemma 4.1]. From [21] and [8], it follows from classification of arithmetic lattices with $c_2 = 3$ that $M$ is either a fake projective plane ($b_1(M) = 0$) or a Cartwright-Steger surface ($b_1(M) = 2$). From [BY], it follows that there is exactly one Cartwright-Steger surface, since $M$ can be defined over $\mathbb{Q}$ and the complex conjugate of $M$ is biholomorphic to $M$ (see [BY, Remark 5.1]). Together with the 50 pairs of fake projective planes classified in [21] and [8], this gives rise to 101 smooth surfaces with $c_2(M) = 3$. □

**References**

BY Borisov L, Yeung S-K. Explicit equations of the Cartwright-Steger surface. Épij Géom Algé, 2020, in press
EG Esnault H, Groechenig M. Cohomologically rigid local systems and integrality. Selecta Math (NS), 2018, 24: 4279–4292
Y Yeung S-K. Foliations associated to harmonic maps on some complex two ball quotients. Sci China Math, 2017, 60: 1137–1148

The online version of the original article can be found at https://doi.org/10.1007/s11425-016-9044-8