Erratum

Unobstructed symplectic packing for tori and hyper-Kähler manifolds

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In the proof of Theorem 9.2 in Section 9.2 of the paper [1] it was erroneously claimed without proof that the Teichmüller space of Kähler forms^a on T^{2n} is connected (meaning that any two cohomologous Kähler forms on T^{2n} are isotopic as Kähler forms). While we do not know whether this claim is true, the proof of Theorem 9.2 in [1] in the case of T^{2n} (the only place in [1] where the claim was used) can be fixed in the following way (see [2] for more details).

Below we use the notations of [1].

Consider the subgroup $\text{Diff}_H \subset \text{Diff}^+$, consisting of all diffeomorphisms of T^{2n} acting by identity on $H^*(T^{2n})$. The action of Diff_H on the Teichmüller space Teich_s of Kähler forms (that is, the space of the Kähler forms on T^{2n} , factorized by the action of Diff_0) preserves the fibers of the period map $\text{Per} : \text{Teich}_s \rightarrow H^2(M, \mathbb{R})$ (that is, the map associating to an element of Teich_s the cohomology class of any Kähler form representing that element).

^aRecall that in [1] a Kähler form is defined as a symplectic form compatible with *some* integrable complex structure.

We claim that this action is transitive on each fiber.^b

Indeed, by Proposition 6.1 of [1], any Kähler form on T^{2n} can be identified with a linear symplectic form by a diffeomorphism of T^{2n} . Moreover, with an appropriate choice of the map F appearing in the proof of that proposition, the latter diffeomorphism can be chosen to belong to Diff_H . Since two linear cohomologous forms on $T^{2n} = \mathbb{R}^{2n}/\mathbb{Z}^{2n}$ coincide, we get that any two cohomologous Kähler forms on T^{2n} — that is, representatives of two points of Teich_s lying in the same fiber of Per — can be mapped into each other by a diffeomorphism from Diff_H , which proves the claim.

The transitivity of the action of Diff_H on the fibers of Per and the fact that Per is a surjective local diffeomorphism imply that for any Kähler form ω on T^{2n} the orbit of the image of ω in Teich_s under the action of $\text{Diff}^+/\text{Diff}_0$ is dense in Teich_s if and only if the orbit of the cohomology class $[\omega]$ under the action of $\text{Diff}^+/\text{Diff}_0$ on $H^2(T^{2n}, \mathbb{R})$ is dense in the image of Per . The rest of the proof of Theorem 9.2 proceeds as in [1].

References

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^bLet us note that for T^{2n} , $n \geq 3$, the group $\text{Diff}_H/\text{Diff}_0$ is infinite (see [3, Thm. 4.1], [4, Thm. 2.5]).