Tôhoku Math. J.
42 (1990), 587–588

CORRECTION AND ADDITION: BUBBLING OUT OF EINSTEIN MANIFOLDS

(Tôhoku Math. J. 42 (1990), 205–216)

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(Received August 4, 1990)

The purpose of this note is to correct an error in [3] which was kindly pointed out by Professors M. T. Anderson and J. Cheeger, and to make additional remarks. The reader is referred to their work [2] for the treatment of bubbling out process from a different viewpoint.

In Theorem 2, the conclusion of being a *Euclidean space* should be replaced by being *flat*.

The *non-flatness* of the bubbled out orbifold (Y, h) in Proposition 2 is important if one applies Theorem 2 in showing that the process of bubbling out terminates in finite steps. Since it is non-trivial contrary to the cases in [1], [4] and [5], we here give a proof. Suppose (Y, h) is flat. Then the ALE orbifold Y is isometric to a flat cone $\boldsymbol{R}^n/\Gamma$ which has only one singularity at the origin y_∞, and the sequence $((X_k, r_0^{-2}g_k), x_{a,k})$ smoothly converges to $((Y, h), y_\infty)$ on any compact set disjoint from y_∞. (See [1], [3], [4] and [5]. If the curvature accumulates at a point other than y_∞, then the limit orbifold Y must have a corresponding singularity.) We take a constant $K>0$ sufficiently large. Then by Proposition 3 or by its proof we have

$$\int_{D(Kr_0, K^{-1}r_\infty)} |R_{g_k}|^{n/2} \leq \frac{\varepsilon}{6}.$$

On the other hand by the definition of r_∞, it holds that for sufficiently large k

$$\int_{D(K^{-1}r_\infty, r_\infty)} |R_{g_k}|^{n/2} \leq \frac{2\varepsilon}{3}.$$

Combining the above two inequalities and the definition of r_0, we get

$$\int_{D(r_0, Kr_0)} |R_{g_k}|^{n/2} \geq \frac{\varepsilon}{6},$$

which in the limit contradicts the flatness of (Y, h);

$$\int_{D(1, K)} |R_h|^{n/2} \geq \frac{\varepsilon}{6}.$$