1047-53-128 **J. Cao** (cao.7@nd.edu), Mathematics department, Notre Dame, IN 46556, and **Jian Ge*** (jge@nd.edu), Mathematics department, Notre Dame, IN 46556. *A new proof to Perelman's collapsing theorem for geometrization of 3-manifolds.* Preliminary report.

We will use an observation of Kasten Grove together with Perelman's convexity lemma to provide a simplified proof of Perelman's collapsing theorem of 3-manifold.

Theorem 1 (Perelman's Collapsing Theorem). Suppose that $\{(M^3_, g^\alpha_{ij})\}_{\alpha\in\mathbb{Z}}$ is a sequence of compact oriented Riemannian manifolds, closed or with convex incompressible tori boundary, and $\omega^\alpha \to 0$. Assume that

1. for each point $x \in M^3_\alpha$ there exists a radius $\rho = \rho^\alpha(x), 0 < \rho < 1$, not exceeding the diameter of the manifold, such that the ball $B_{g^\alpha}(x, \rho)$ in the metric g^α_{ij} has volume at most $\omega^\alpha\rho^3$ and sectional curvatures of g^α_{ij} at least $-\rho^{-2}$;

2. each component of the boundary of M^α has diameter at most ω^α and has a topological trivial collar of length one, where the sectional curvatures are between $(-1/4 - \epsilon)$ and $(-1/4 + \epsilon)$

Then, for sufficiently large α, M^3_α is diffeomorphic to a graph-manifold. (Received January 24, 2009)