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Michael Freeze* (freezem@uncw.edu), Department of Mathematics and Statistics, 601 South College Road, Wilmington, NC 28403, and **Alfred Geroldinger**. *Unions of Sets of Lengths*.

Let H be an atomic monoid. For $k \in \mathbb{N}$ let $\mathcal{V}_k(H)$ denote the set of all $m \in \mathbb{N}$ such that there exist atoms $u_1, \dots, u_k, v_1, \dots, v_m \in H$ with $u_1 \cdots u_k = v_1 \cdots v_m$. We consider conditions on H for which $\mathcal{V}_k(H)$ is eventually an arithmetical progression. (Received February 10, 2009)