

Highlights:

**Development of a cost-effective IoT system:** This study presents a cost-effective and scalable system for long-term indoor radioactivity monitoring that integrates low-cost Geiger-Müller (GM) detectors with the microcontroller platform.

**Hourly level correlation:** Results showed moderate positive correlations between hourly GM detector count rates and radon concentrations ( $r=0.35-0.55$ ), with accuracy further improved by averaging signals from multiple channels.

**High reliability of daily trends:** By applying 24-hour moving averages, the correlation with the reference Airthings device became very strong ( $r=0.88-0.95$ ), confirming that the system effectively tracks daily radioactivity variations.