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Optical detection of alpha emitting radionuclides in the environment

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Radiological emergencies involving accidental or deliberate dispersion of alpha emitting radionuclides in the environment can cause significant damage to humans and societies in general. A detection system to measure large-scale contamination of these radionuclides is currently not available. In case of a contamination, the only option is to evacuate the population from the affected areas and then run diagnostics by hand due to the short range of alpha particles in air, exposing thus the emergency teams to considerable risk. Even then, the results of emergency field applications are notoriously ambiguous, time consuming and tedious due to the centimetre range of the alpha particles in air. A novel detection approach which is capable of remote detection of alpha-emitting radionuclides in the environment will be reported. This approach will assist the on-site incident management and will enable detection of contamination threats without contact—from safe distances—avoiding thus contamination of operators and equipment.