Gas-Scintillation chamber for superheavy elements (SHE) detection at GANIL.

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The main method of identification of superheavy elements relies on the detection of radioactive alpha/SF (spontaneous fission) decay chains from the SHE implanted in the Si detector. The essential point of that method is the way alpha particles are identified. Usually it is required that the signal in the implantation detector is in anti-coincidence with the time of flight system (ToF). In cases when the background is small the method works well. For larger background, especially when it is composed of other light particles (e.g. protons), such a definition of registered alpha decays can not be sufficient, because background protons can produce a signal in the implantation detector which is also in anti-coincidence with the ToF system. In effect these protons mimic alpha decays. In order to obtain a more effective identification of SHE elements and a more precise definition of alpha decays we propose to use a new type of gas-scintillation chamber. It detects scintillations produced by the heavy ion passing through a gas medium. It also has tracking capabilities that help to determine the trajectory of the particle entering/escaping the implantation detector. The chamber will be mounted, together with implantation position sensitive detector and tunnel detectors, in the detection setup working in GANIL. Other main characteristics of that chamber are: 4pi geometry (it will be mounted close to the implantation detector), detection of light charged particles and spontaneous fission fragments. The fast pulses produced by the scintillation part of the detector can be used in the time of flight techniques and to eliminate pileup events that mimic production of very heavy nuclei. Test measurements done with Cf source will be presented.