uRANIA: a micro-Resistive WELL for neutron detection Matteo Giovannetti - LNF-INFN on behalf of the uRANIA-V project Cathode PCB u Copper 5 um R Summary and results kaptor HOTNES ENE. 50 um Drift gap test facility 140 um (3-6 mm) A DLC layer (<0.1 μm ρ~10÷100 MΩ/□ Efficienze preliminari uRANIA-V @HOTNES, Ar:CO.;CF, 45:15:40 Pre-preg % INFN From **simulations**. **Custom FEE** Data current mesh The **µ-RWELL** detector Rigid PCB Efficiency to results! ✤ Data counting picoscope groove 5 electrode Data counting scaler groove **Results for HOTNES** Data counting scaler planar spectrum (100meV)! alli 1.006 Data counting picoscope planar Std Dev Data current planar **Detection efficiency** ¹⁰B neutron converter - GEANT4 planar for thermal neutron (25meV) increases by a factor of two Due to the ³He shortage a call for alternative solutions for thermal neutron detection arise. A ¹⁰**B conversion stage** facing the gas gap, through **nuclear capture**, transforms a standard µ-RWELL in a thermal neutron detector, reaching efficiency up to 10% for single detector plane. 2.5 3 3.5 4 45 1.5 Boron Thickness [um] Different **converter geometries** are accessible: -/DDG/lavori/uRANIA ATTRACT/202006 hotnes enea/effici For the **planar cathode** a scan for different ¹⁰B thickness has been performed in <u>current mode</u>, measuring an efficiency $\approx 1.5 \div 2.0\%$ Metallic The palanar ¹⁰B-coated **cathode +** ¹⁰B-coated **mesh** configuration meshes characterized in current mode exhibits an efficiency of **4.6±1.0%** The counting mode measurements, performed for the ¹⁰B-coated **planar** and **grooved** cathode layouts show the following results: Planar Planar $\rightarrow 2.19 \pm 0.05\%$ Grooved cathodes Grooved $\rightarrow 2.61 \pm 0.06\%$ cathodes