

Abstract Submitted  
for the MAR17 Meeting of  
The American Physical Society

**Nano-assays for the detection of circulating biomarkers and their interaction dynamics** LOREDANA CASALIS, PIETRO PARISSÉ<sup>1</sup>, Elettra Sincrotrone Trieste, ELENA AMBROSETTI, University of Trieste, NANOINNOVATION LAB TEAM — The availability of devices for cancer biomarker detection at early stages of the disease is one of the most critical issues in biomedicine. Towards this goal, to increase the assay sensitivity, device miniaturization strategies empowered by the employment of high affinity protein binders constitute a valuable approach. We propose here two different surface-based miniaturized platforms for biomarker detection in body fluids: the first platform is an atomic force microscopy (AFM)-based nanoarray, where AFM is used to generate functional nanoscale areas and to detect biorecognition through careful topographic measurements; the second platform consists of a miniaturized electrochemical cell to detect biomarkers through electrochemical impedance spectroscopy (EIS) analysis. Both devices rely on robust and highly-specific protein binders as aptamers or nanobodies and were tested for the detection of thrombin as well as relevant cancer biomarkers as the circulating portion of Her2. We succeeded in capturing antigens in concentrations as low as tens of pM, in conditions of real matrix (serum) and low biosample volumes ( $\mu\text{L}$  range).

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Date submitted: 11 Nov 2016

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