

# MPS – rapid binding test device

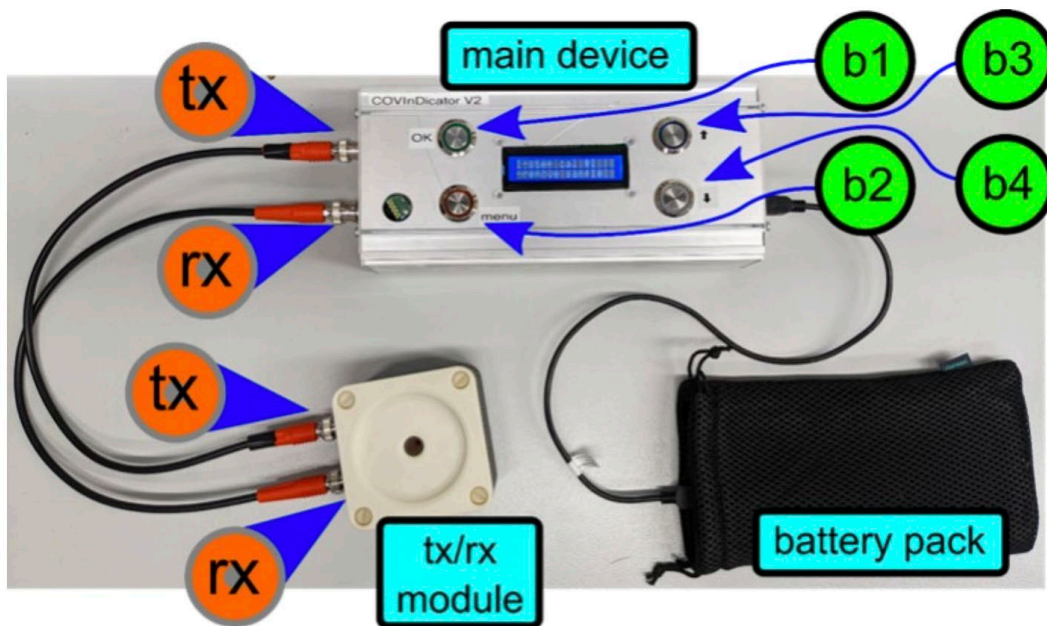
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## CHALLENGE

Magnetic particle spectroscopy (MPS) is a versatile, inexpensive, fast and sensitive measurement technique with the potential to be used for biomedical assays using specific functionalized superparamagnetic iron-oxide nanoparticles (SPIONs). However, up to now, current implementation of MPS devices lack the versatility and sensitivity of established methods like RT-PCR, immunofluorescence assays or ELISA.

## INNOVATION

The invention describes a rapid and highly sensitive method to assess the mobility change of functionalized SPIONs to detect binding between biological molecules with sensitivities competitive to ELISA, PCR and flow cytometry. By comparing sample and reference signal a concentration-independent determination of biomolecule binding modalities can be accomplished. The inventive method provides a simple, rapid and low cost alternative for highly sensitive detection of molecules in solution, suitable for biomedical assays or in quality control management. Remarkably, the specific binding of SARS-CoV-2 spike protein S1 could be evaluated with a sensitivity orders of magnitude higher than standard MPS/ACS devices and competitive to ELISA or PCR with a sensitivity of 1-2 BAU (binding antibody unit), which is equivalent to about 1fM. Instead of several hours for a PCR test results are obtained in less than a second.



Inventive MPS device setup

## COMMERCIAL OPPORTUNITIES

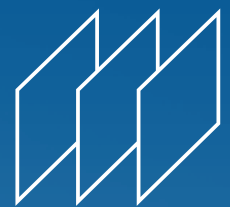
- Biological and biomedical assays, cell-labeling and -tracking, blood analysis
- Point of care diagnostics, Quality management

## DEVELOPMENT STATUS

- Fully functional prototype shows detection of SARS-CoV-2 spike protein S1

## REFERENCES:

- 1 Vogel, P., Rückert, M.A., Friedrich, B. et al. Critical Offset Magnetic Particle Spectroscopy for rapid and highly sensitive medical point-of-care diagnostics. Nat Commun 13, 7230 (2022). <https://doi.org/10.1038/s41467-022-34941-y>



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