

## Introducing HR- $\mu$ MAS NMR probe for $\mu$ g-scale samples

Covadonga Lucas-Torres, Yusuke Nishiyama, Alan Wong

► **To cite this version:**

Covadonga Lucas-Torres, Yusuke Nishiyama, Alan Wong. Introducing HR- $\mu$ MAS NMR probe for  $\mu$ g-scale samples. Metabomeeting 2017, Dec 2017, Birmingham, United Kingdom. cea-02341000

**HAL Id: cea-02341000**

**<https://hal-cea.archives-ouvertes.fr/cea-02341000>**

Submitted on 31 Oct 2019

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Title: Introducing HR- $\mu$ MAS NMR probe for  $\mu$ g-scale samples

Authors: Covadonga Lucas-Torres (1), Yusuke Nishiyama (2), Alan Wong (1)

Affiliations: (1) NIMBE, CEA, CNRS, Université Paris-Saclay, CEA Saclay 91191 Gif-sur-Yvette, France ; (2) JEOL RESONANCE Inc., 3-1-2 Musashino, Akishima, Tokyo 196-8558, Japan

NMR has already proven to be a tremendous spectroscopic tool in metabolomics. However, due to its low detection sensitivity, NMR analyses can be challenging especially for mass-limited samples. To overcome this issue, here we introduce a 'new' reliable methodology for profiling  $\mu$ g/nL scale samples based on the Magic Angle Spinning (MAS) technique - High-Resolution  $\mu$ MAS (HR- $\mu$ MAS). HR- $\mu$ MAS offers an outstanding opportunity for the detection of metabolites in  $\mu$ g samples with good sensitivity and high spectral resolution, which could widen the existing NMR-based spectroscopy to metabolomic applications and pave the path to its utilization in numerous fields of study.

In comparison to the previous approach with the spinning  $\mu$ -coil (HR-MACS) [1], HR- $\mu$ MAS [2] renders improvements in probe practicality, sample-preparation, data repeatability and in the flexibility of NMR experiments. Moreover, we also show the possibility of performing metabolic quantification using HR- $\mu$ MAS – important analytical component in metabolomics. The excellent NMR spectroscopic capabilities of HR- $\mu$ MAS shown here for NMR metabolic profiling on  $\mu$ g/nL samples have demonstrated that HR- $\mu$ MAS could have an impact on future NMR-based metabolomics in biological applications.

[1] Wong, A., Li, X., Molin, L., Solari, F., Elena-Herrmann, B., Sakellariou, D. (2014)  $\mu$ High Resolution-Magic-Angle Spinning NMR Spectroscopy for Metabolic Phenotyping of *Caenorhabditis elegans*. *Anal. Chem.*, 86, 6064–6070.

[2] Duong, N. T., Endo, Y., Nemoto, T., Kato, H., Bouzier-Sore, A.-K., Nishiyama, Y., & Wong, A. (2016). Evaluation of a high-resolution micro-sized magic angle spinning (HR $\mu$ MAS) probe for NMR-based metabolomic studies of nanoliter samples. *Anal. Methods*, 8(37), 6815–6820.

