

DATE: 26/07/2021

To:
Günther Hasinger,
ESA Director of Science

Preface concerning the signatories of this letter:

This letter is signed by 47 representatives of Voyage 2050 White Papers proposing the use of cold atom-based quantum technology in space (see below). In addition to these signatories, 174 members of the cold atom, astrophysics, cosmology, fundamental physics and earth observation communities have co-signed this letter electronically [0].

Reference: cold atom experiments in space community response to the final recommendations of the Voyage 2050 Senior Science Committee

Dear Prof. Günther Hasinger,

As members of the communities interested in cold atom (CA) experiments in space, we welcome the final recommendations of the Voyage 2050 Senior Science Committee and stand ready to work with the ESA Executive to implement them. We understand that now is the right time to develop a pathway to raise the TRLs of CA technologies for space as well as the astrophysics, cosmology, fundamental physics, and earth observation cases for their deployment.

A quantum technology development programme coordinated at the Europe-wide level should build upon initial experiments and expertise in Europe and elsewhere to define, together with the interested technology and science communities, a roadmap and milestones to demonstrate the readiness of CA technologies in space, as emphasised in the Voyage 2050 recommendations, and in synergy with EU programmes.

The combined CA, astrophysics, cosmology and fundamental physics, and earth observation communities would like to contribute actively to shaping this development programme, by proposing a joint community roadmap as input to it. With this end in view, we are planning to hold a workshop in September to discuss elements of the roadmap and to write a draft proposal as input for ESA.

This community workshop will build upon one organised two years ago [1], which also reviewed the CA landscape for space. Subsequently, several White Papers were submitted [2-8] in response to the Voyage 2050 call, which outlined possible ultimate goals and reviewed experiments and technical developments underway that could help pave a way towards these goals. Like the previous workshop, this second one would bring

together not only the CA community but also the potential user communities interested in its science goals and lead to a follow-up community White Paper. This would outline technological milestones as well as refine interim and long-term scientific goals.

We would like to invite you and any other ESA representative relevant in this process to participate in the event and give input and advice on how to make this community roadmap most useful.

References

[0]<https://indico.cern.ch/event/830432/attachments/1867792/3889249/Registered-co-signatories-of-the-community-letter-to-ESAs-Director-of-Science-Guenther-Hasinger-RegistrantsBook-24072021.pdf>

[1]<https://indico.cern.ch/event/830432/>

[2]https://www.cosmos.esa.int/documents/1866264/3219248/BuchmuellerO_White-Paper-AEDGE-submitted-02082019.pdf/678dff63-4773-3590-65a8-0494f5b09f8a?t=1565184625388
<https://epjquantumtechnology.springeropen.com/articles/10.1140/epjqt/s40507-020-0080-0>

[3]https://www.cosmos.esa.int/documents/1866264/3219248/WolfP_EP_Voyage2050_V5.pdf/24127ca3-ef2c-3f92-f118-a3a83da19d92?t=1565184757173
<https://arxiv.org/abs/1908.11785>

[4]https://www.cosmos.esa.int/documents/1866264/3219248/BassiA_QT_In_Space_-_White_Paper.pdf/6f50e4bc-9fac-8f72-0ec0-f8e030adc499?t=1565184619333


[5]https://www.cosmos.esa.int/documents/1866264/3219248/TartagliaA_Voyage2050LaDaHaD.pdf/b8cda725-5ea3-5023-a6da-fd2fd60a2806?t=1565184670696

[6]https://www.cosmos.esa.int/documents/1866264/3219248/SchneiderJ_ESA-Voyage2050-QM-JS.pdf/517296a4-9698-e5f0-07d4-9f211a039631?t=1565184662937

[7]https://www.cosmos.esa.int/documents/1866264/3219248/BergeJ_WP_Dark_Sector_ONERA.pdf/04d0f4f5-921d-69b4-f0e2-ed5ac4eb0c84?t=1565184621729

[8]https://www.cosmos.esa.int/documents/1866264/3219248/BerryC_High_frequency_Voyage_2050_white_paper_submit.pdf/d68ddea0-15f4-5fd2-7fb7-9bdeeb28abbf?t=1565184622145

Signatures of White Paper authors of the Voyage 2050 call



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Albert De Roeck

Prof. Albert De Roeck, CERN, Geneva, Switzerland, and University of Antwerp, Belgium



Prof. John Ellis, King's College London, UK



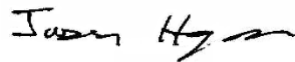
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Prof. Igor Pikovski, Stockholm University, Sweden



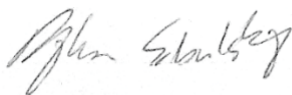
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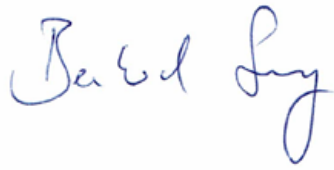
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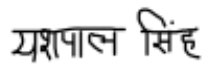
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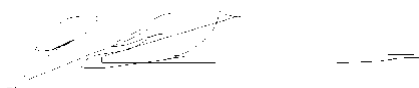
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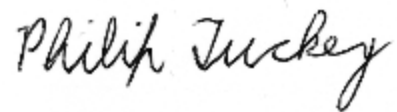
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Handwritten signature of Lisa Wörner in black ink, featuring a stylized 'L' and 'W'.

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