KU LEUVEN

Dep. Natuurkunde en Sterrenkunde
Celestijnenlaan 200d – bus 2412
3001 Leuven, België

ELECTION STATEMENT – VIRGO DATA ANALYSIS COORDINATOR

Saturday, 19 November 2022
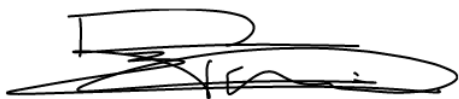
Dear Members of the VSC,

For almost 15 years, I have been active in the gravitational-wave community as a member of one of the constituents of the LVK Collaboration. During this time, I have amassed a wealth of experience and built a large network, which enables me to be an effective Data Analysis Coordinator, if elected. Some of my relevant experience in data analysis are

- **Broad working experience in multiple working groups**: I have worked in the TGR working group (co-chaired for 5 years), developed search pipelines (`gstlal`) and instigated the newly minted lensing workgroup (Editorial Team Lead for the O3b lensing paper). Moreover, I have research experience in topics such as complementary filters for vibration isolation systems, cosmography, inferring nuclear equation state and relativistic magnetohydrodynamics simulations.

- **Extensive leadership/service track record:** I have taken leadership roles within the LVK collaboration, which enables me to cater to unique needs across different source groups and working groups. These roles include memberships of the LSC Council and the KAGRA Scientific Congress, co-chair of the TGR working group, Editorial Team lead/member of various collaboration papers (O3b Lensing, GW190421 discovery), reviewer of pipelines (lead reviewer spiir) and collaboration papers (GW150914 TGR).

- **Affinity with different collaborations:** I bring a unique network and insight into the working of all major constituents of the LVK Collaboration, which allows me to effectively represent the Virgo Data Analysis community in what are often difficult discussions with different stake holders.

If elected, I will perform the duties of the DAC chair to my utmost ability and in accordance with the role description in the new by-laws. Moreover, I will make the following items my focal points

- **Serve the Virgo data analysis community:** The Virgo Collaboration is contributing to the global gravitational-wave community in its own unique ways, with a focus on detector characterisation for the Advanced Virgo detector, different detection pipelines, and unique scientific analyses. I will seek to serve all of these aspects and support a sense of community with open interaction and collaboration.

- **Defend and push Virgo science:** Recent years have seen the LSC and Virgo Collaboration grow apart in what it considers to be "core science". The Virgo Collaboration has its roots in fundamental and astrophysics, and this needs to remain the key science goals of the collaboration. This means that Virgo's key science goals need to remain at the highest priority, and the data release timeline does not interfere with any of these goals. I will work with the source and working group co-chairs to strongly defend "Virgo Science" at all layers of the LVK collaboration. A strong (formal or informal) science programme (for O4/O5 and beyond) is required to counter the ongoing demoting of scientific targets.

- **Seek synergy with Einstein Telescope Collaboration:** The newly formed Einstein Telescope Collaboration may have an impact on the daily operation of the Virgo Collaboration, but may also be a unique opportunity to foster innovation. I will seek to work with the ET Observational Science Board to develop new ideas into fully operating searches/analyses that can contribute to Virgo's key science goals.

Thank you very much for your time and interest, and I look forward to serving you as the next Data Analysis Coordinator.

Tjonnie G. F. Li
Associate Professor (BOF)
Department of Physics and Astronomy
Department of Electrical Engineering (ESAT)

TJONNIE G. F. LI
CURRICULUM VITAE

EDUCATION

2009 – 2013	**PhD (Cum Laude) in Physics**	VU University Amsterdam
	Winner Stefano Braccini Thesis Prize	
2008 – 2009	**MSci in Physics**	University of Cambridge
2005 – 2008	**BA (Hons) in Physics**	University of Cambridge

PROFESSIONAL EXPERIENCE

2021 – pres.	**Associate Professor (Research)**	KU Leuven
2020 – 2021	**Associate Professor**	Chinese University of Hong Kong
2016 – 2020	**Assistant Professor**	Chinese University of Hong Kong
2015 – 2016	**Research Assistant Professor**	Chinese University of Hong Kong
2013 – 2015	**Rubicon Postdoctoral Fellow**	California Institute of Technology

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PROFESSIONAL SOCIETIES

2021 – pres.	Member	Virgo Collaboration
2016 – 2021	Member	KAGRA Scientific Collaboration
2013 – 2021	Member	LIGO Scientific Collaboration
2009 – 2013	Member	Virgo Collaboration

POSITIONS OF RESPONSIBILITY/LEADERSHIP

2022	Editorial Team Lead	O3b Lensing Paper (CBC)
2020 – pres.	Review Lead	Spiir pipeline (CBC)
2017 – 2022	Co-chair	Testing GR Working Group (CBC)
2019 – 2021	Member	KAGRA Editorial Board
2019 – 2020	Editorial Team Member	GW190521 Discovery Paper (CBC+Burst)
2015 – 2016	Paper Reviewer	GW150914 Testing GR Paper (CBC)

PRESENT/PAST CONTRIBUTIONS

- Detection and interpretation of gravitational waves that are gravitationally lensed by massive intervening objects such as galaxies and black holes. This includes calculating the rate of lensed signals, developing novel methods to find lensed signals and to infer lens properties.
- Devising new methods to test fundamental aspects of general relativity including the no-hair theorem, the black hole area theorem and the dispersion relationship of gravitational waves.
- Constrained the fraction of primordial black holes in dark matter through the potential incoherent superposition of their gravitational wave signals.
- Developed search algorithms for detecting gravitational waves from binary black holes (`gstlal`).
- Developed a novel Bayesian inference framework to test general relativity using merging compact objects.
- Developed techniques to use a collection of merging neutron-star signals to reveal the physics that govern ultra-dense matter.
- Developed a novel method to perform cosmological measurement with gravitational waves alone.