

The importance of the Einstein Telescope for Belgian science

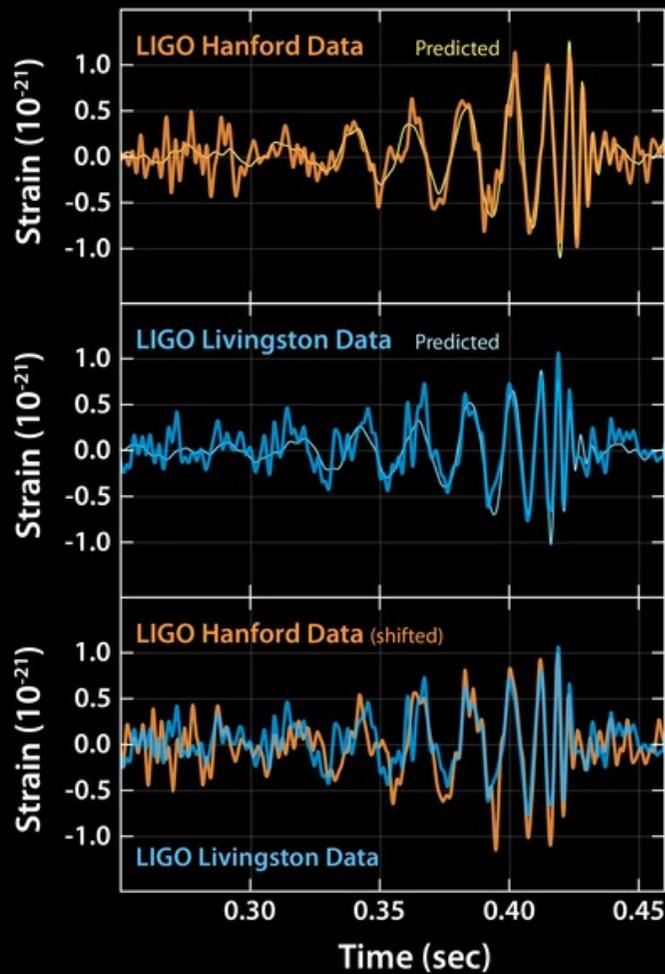
Jean-René Cudell

ULiège

January 30, 2018

- ★ **Why the Einstein Telescope?**
- ★ **Impact on sciences**
- ★ **Situation in Belgium**

14/09/2015



LIGO Black-hole merger



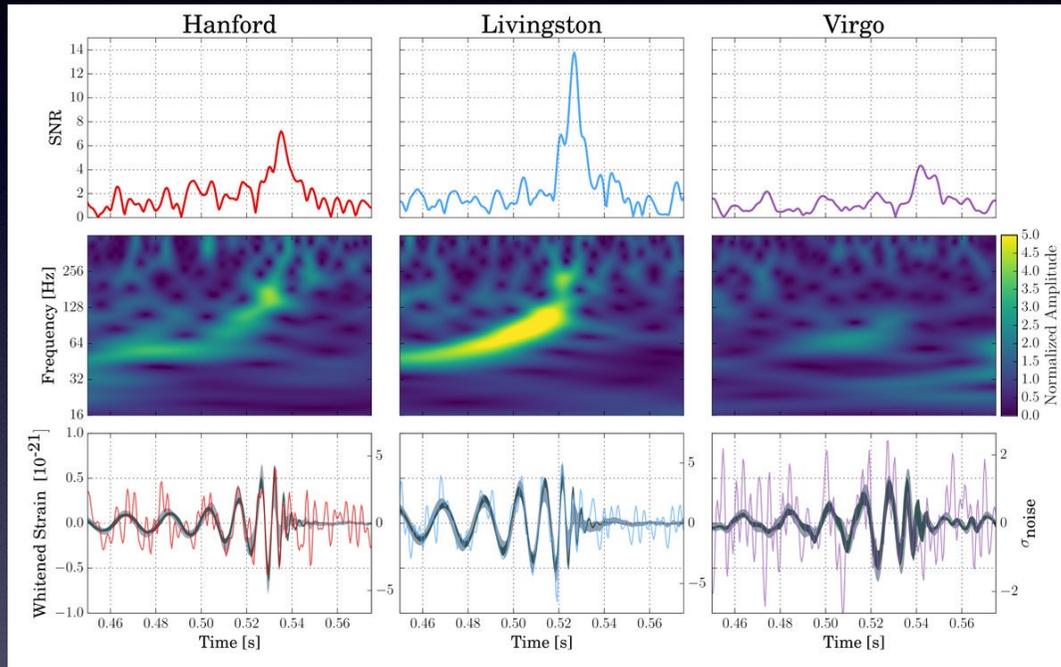
The Nobel Prize in Physics 2017

Rainer Weiss, Barry C. Barish and Kip S. Thorne

"for decisive contributions to the LIGO detector and the observation of gravitational waves"

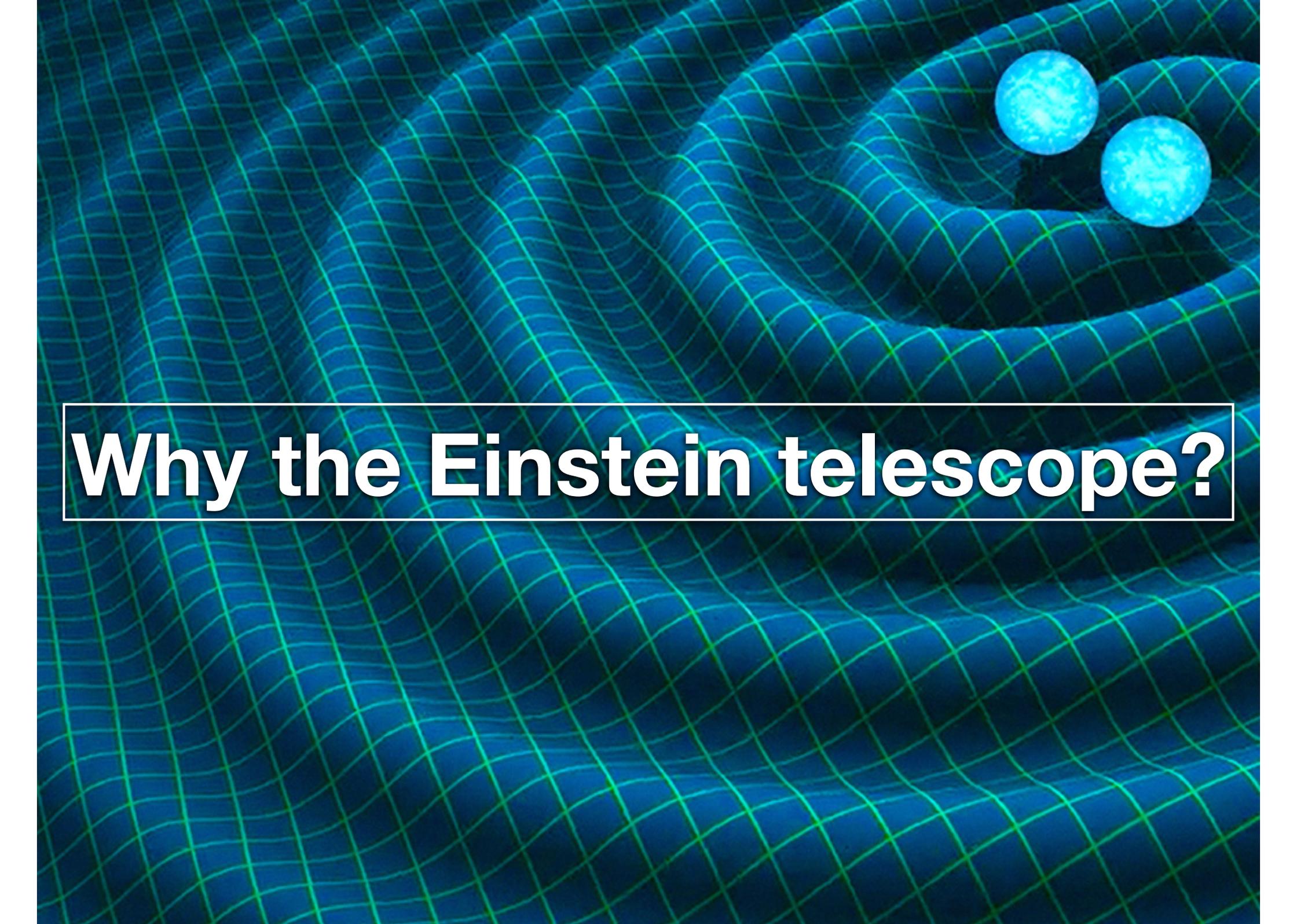
Birth of gravitational wave astronomy

08/06/2017



LIGO+Virgo
Neutron-star merger

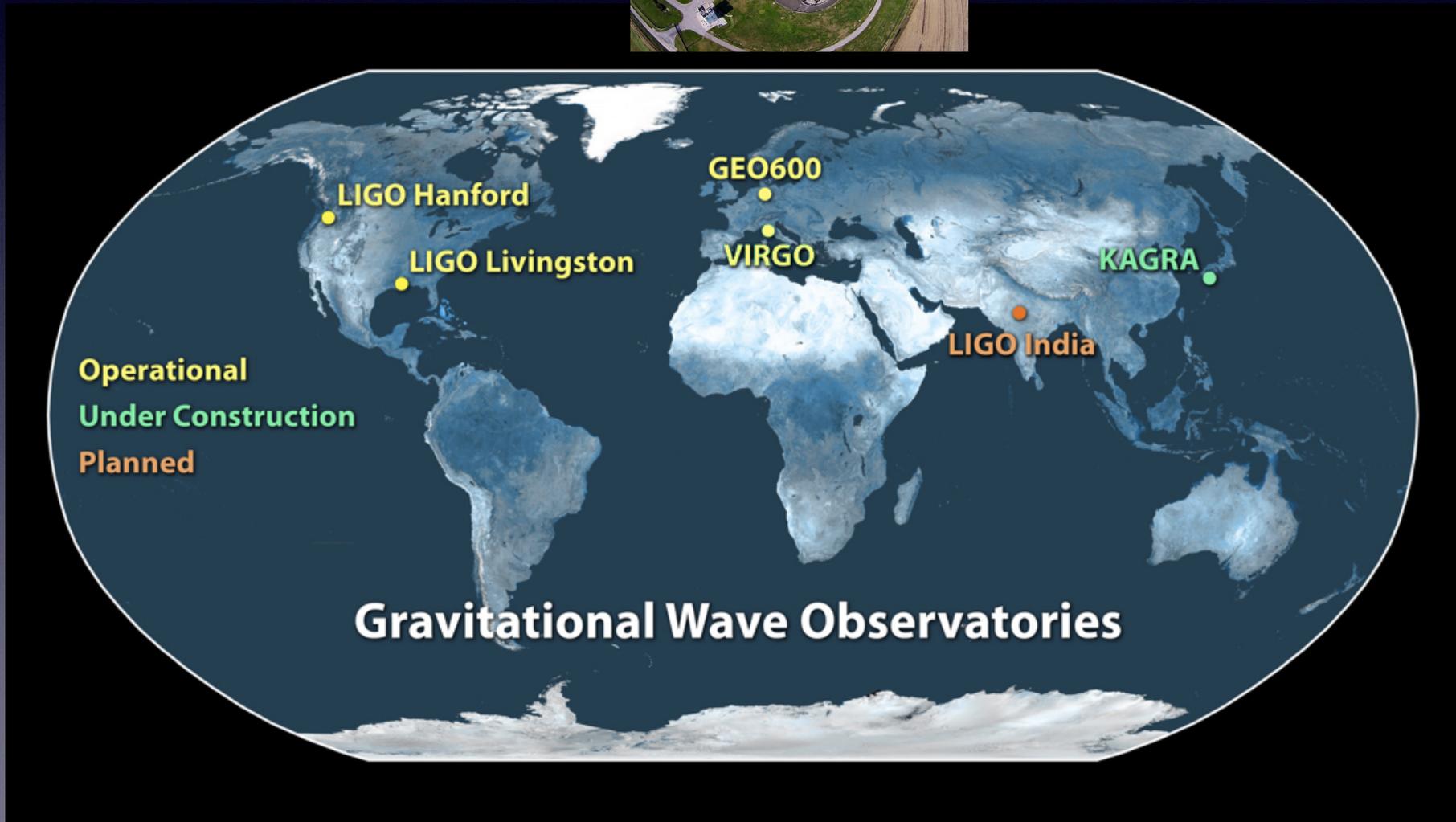
Birth of multi-messenger astronomy



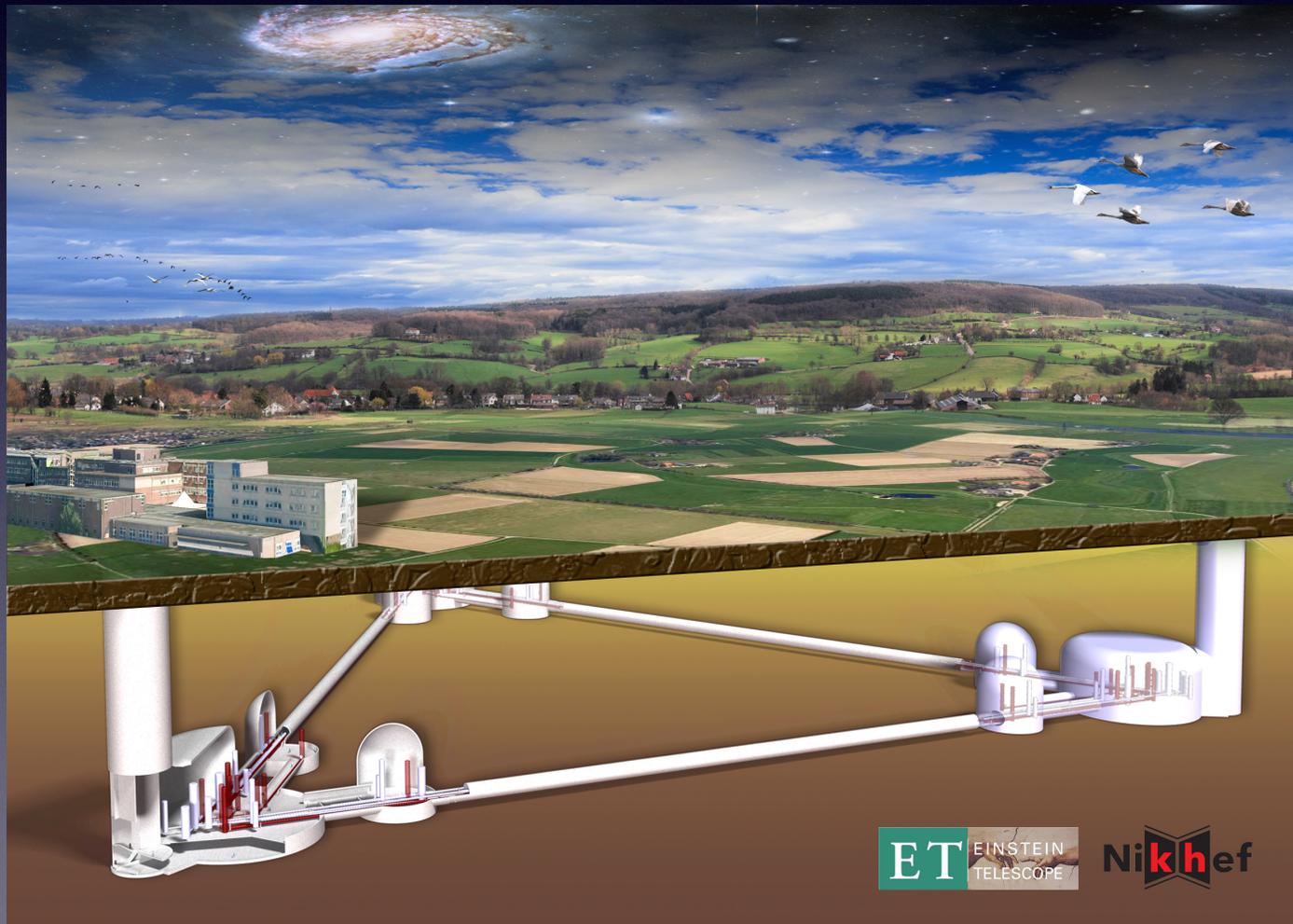
Why the Einstein telescope?

2nd generation observatories

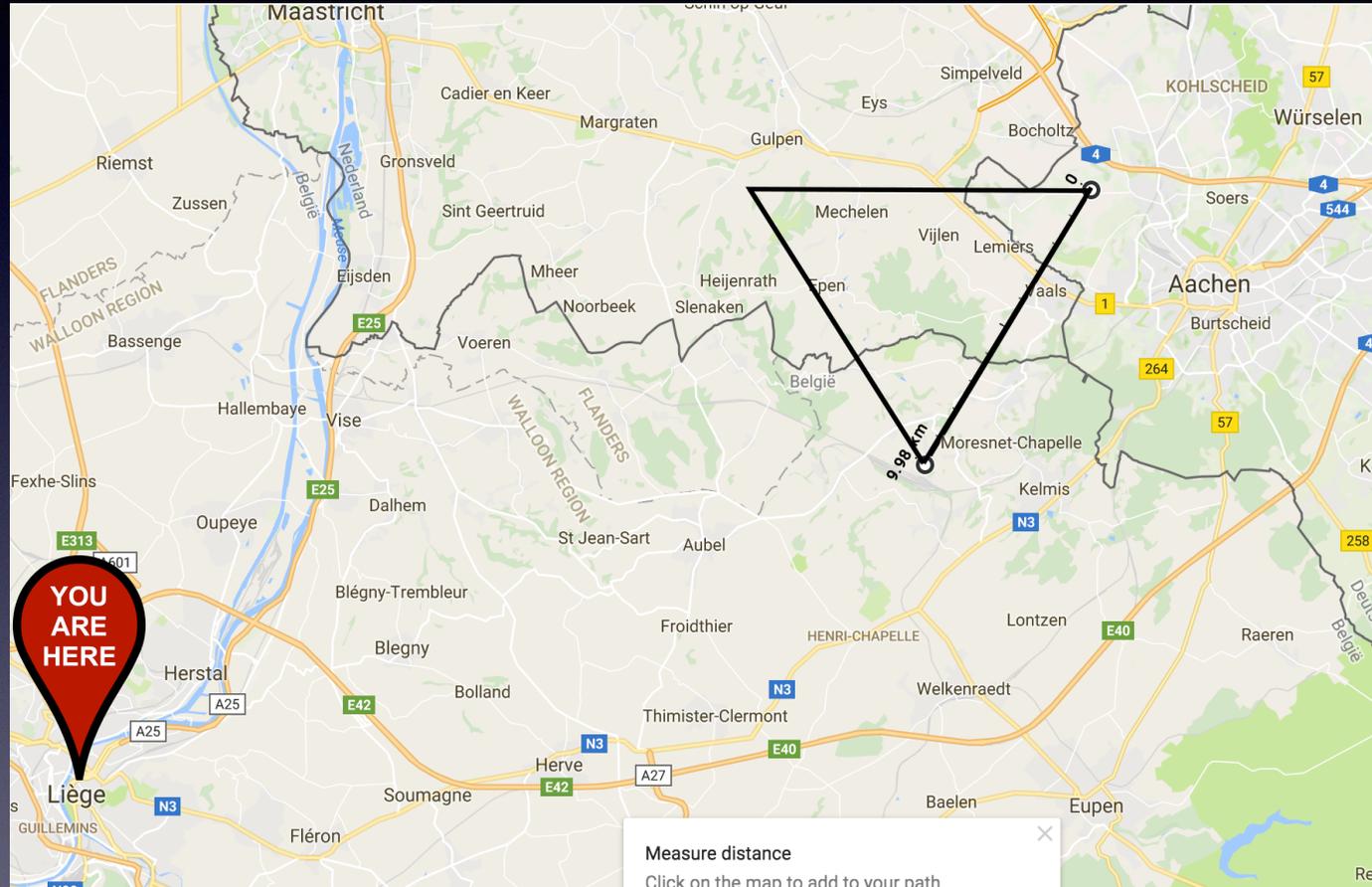
L-shape interferometers, on the ground, km arms

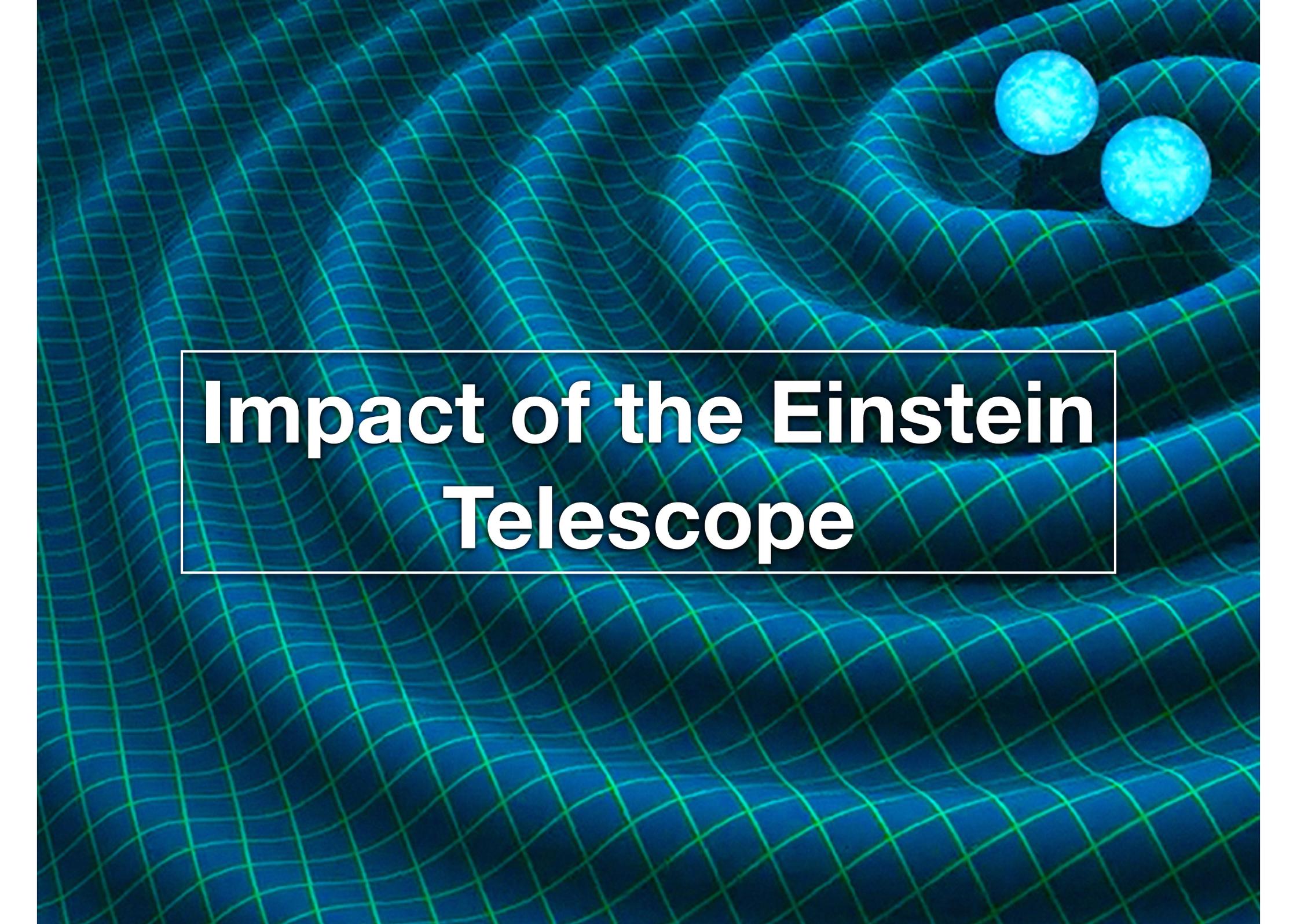


3rd generation: Einstein Telescope
triangle, 10 km side, underground
> 100 000 events/year



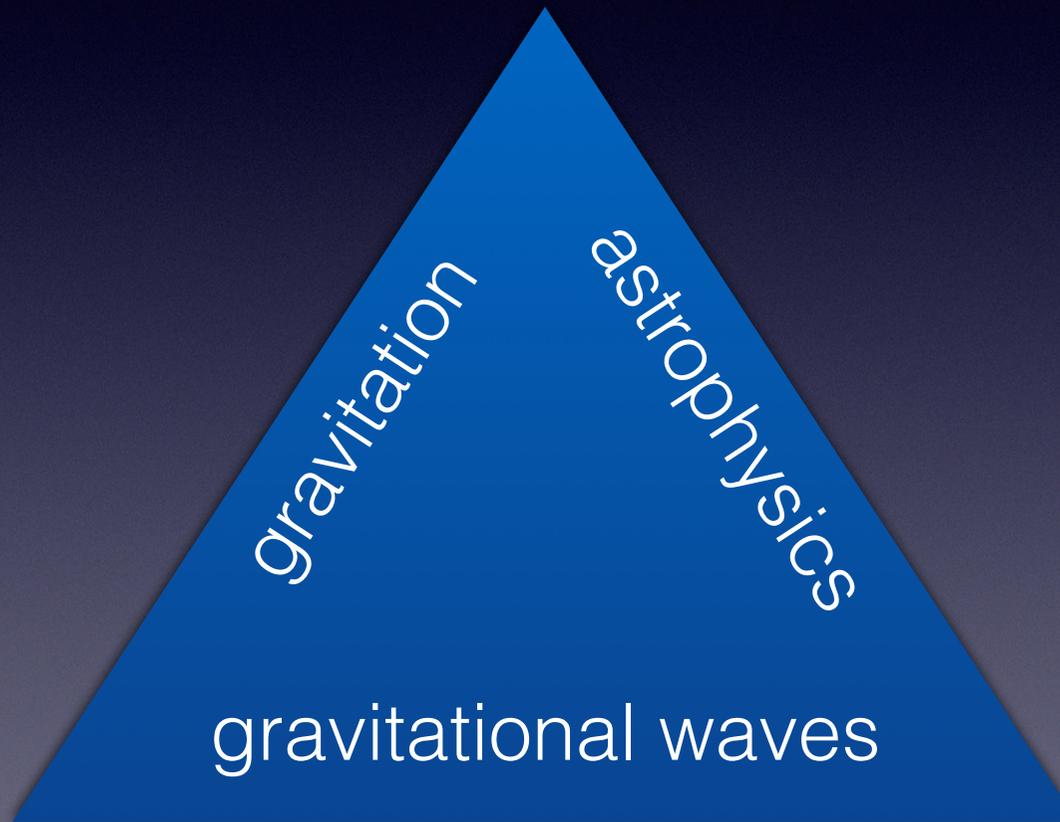
One of the Einstein Telescope projects



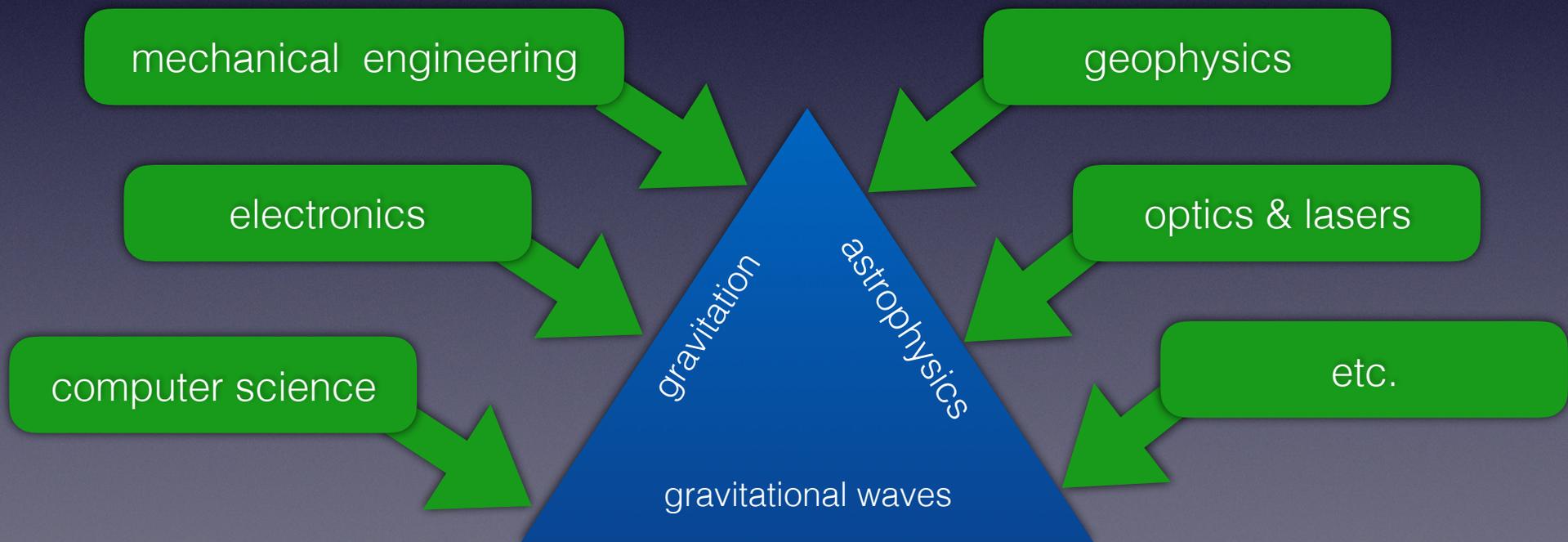


Impact of the Einstein Telescope

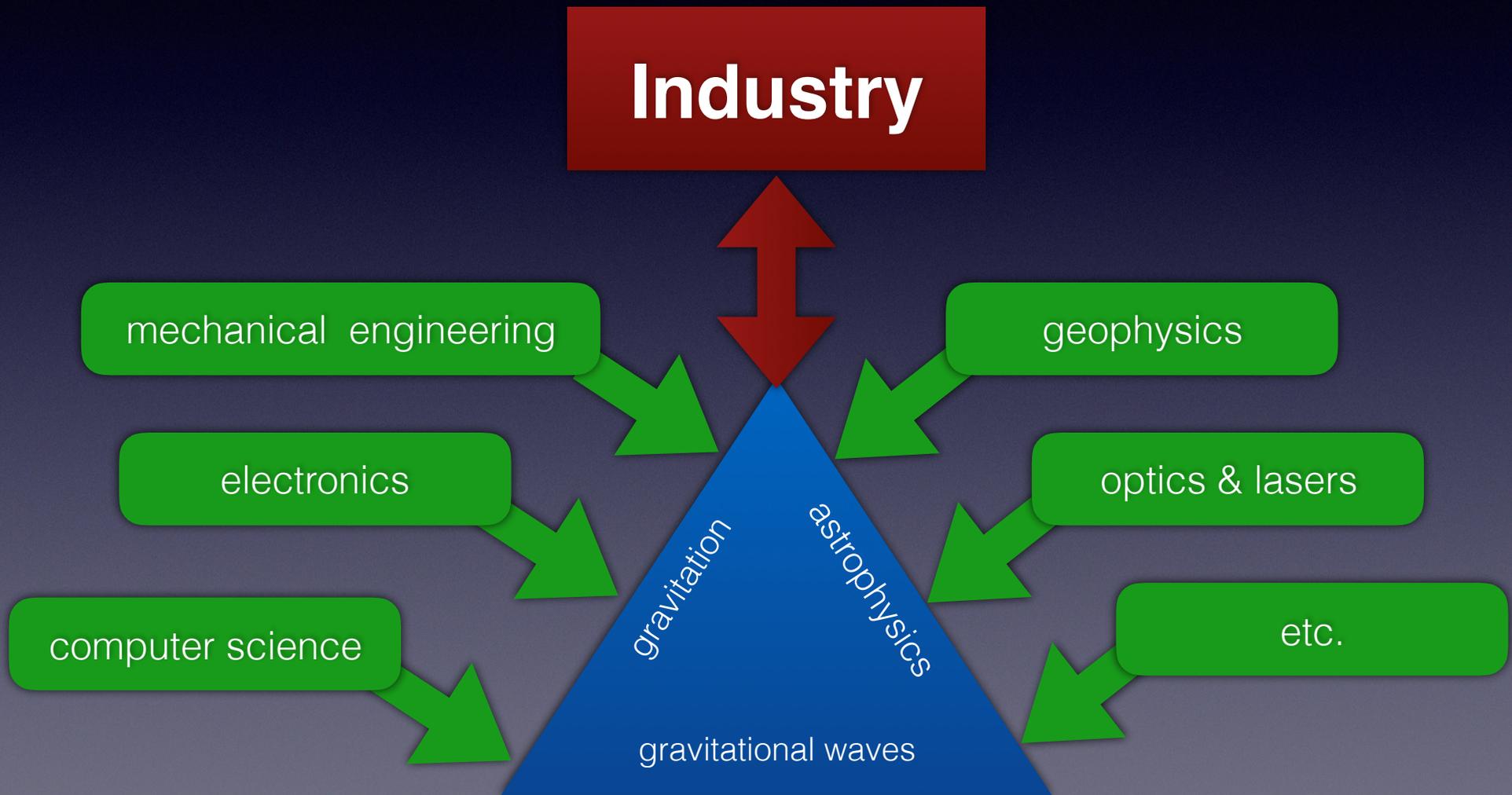
The science case

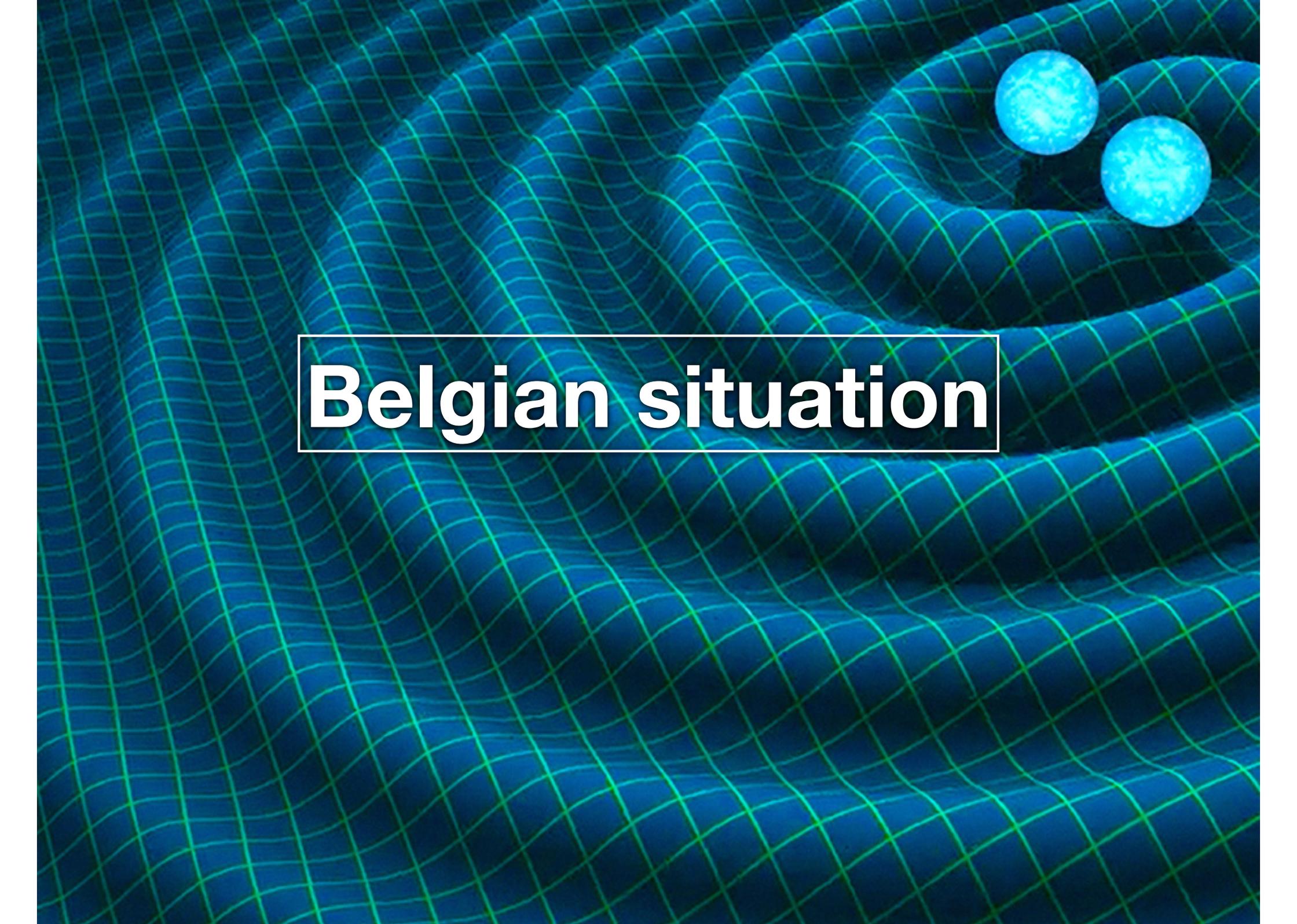


The bigger picture

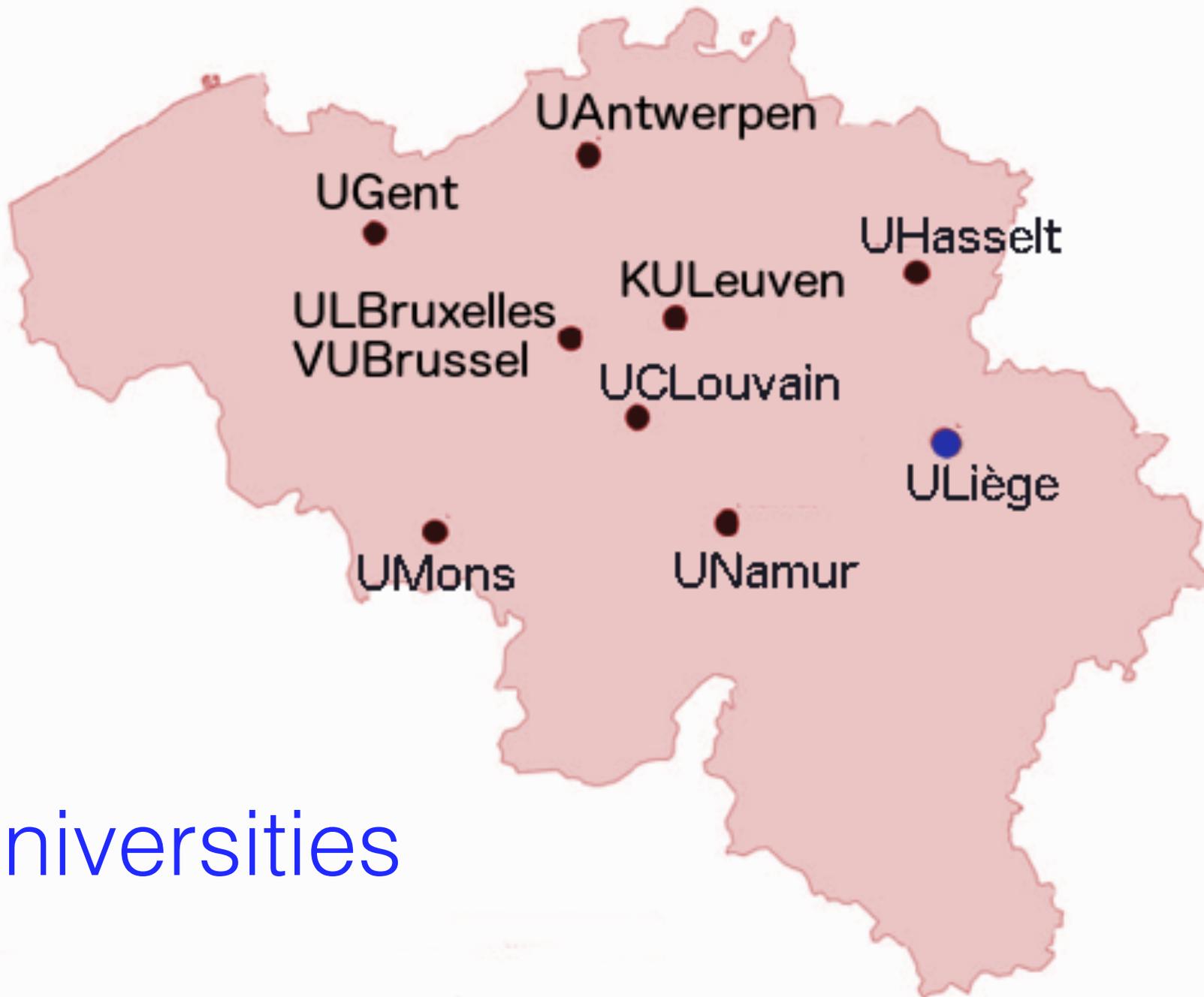


The bigger picture

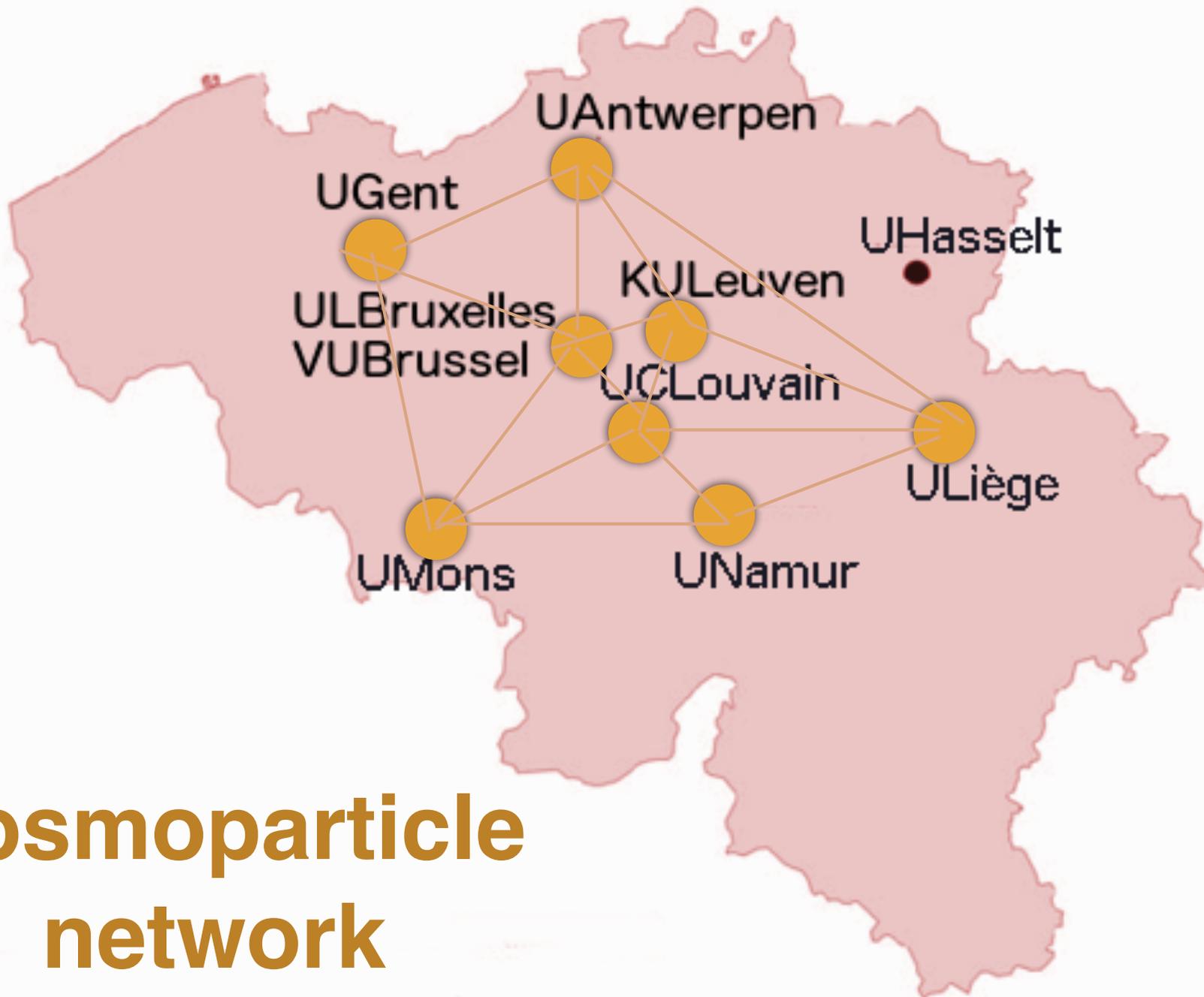


The background of the slide is a 3D visualization of a curved spacetime grid. The grid is composed of blue and green lines that form a mesh. The grid is curved, with a prominent dip or well in the upper right quadrant. Two glowing blue spheres are positioned within this well, representing celestial bodies or particles. The overall color scheme is dominated by blue and green tones.

Belgian situation



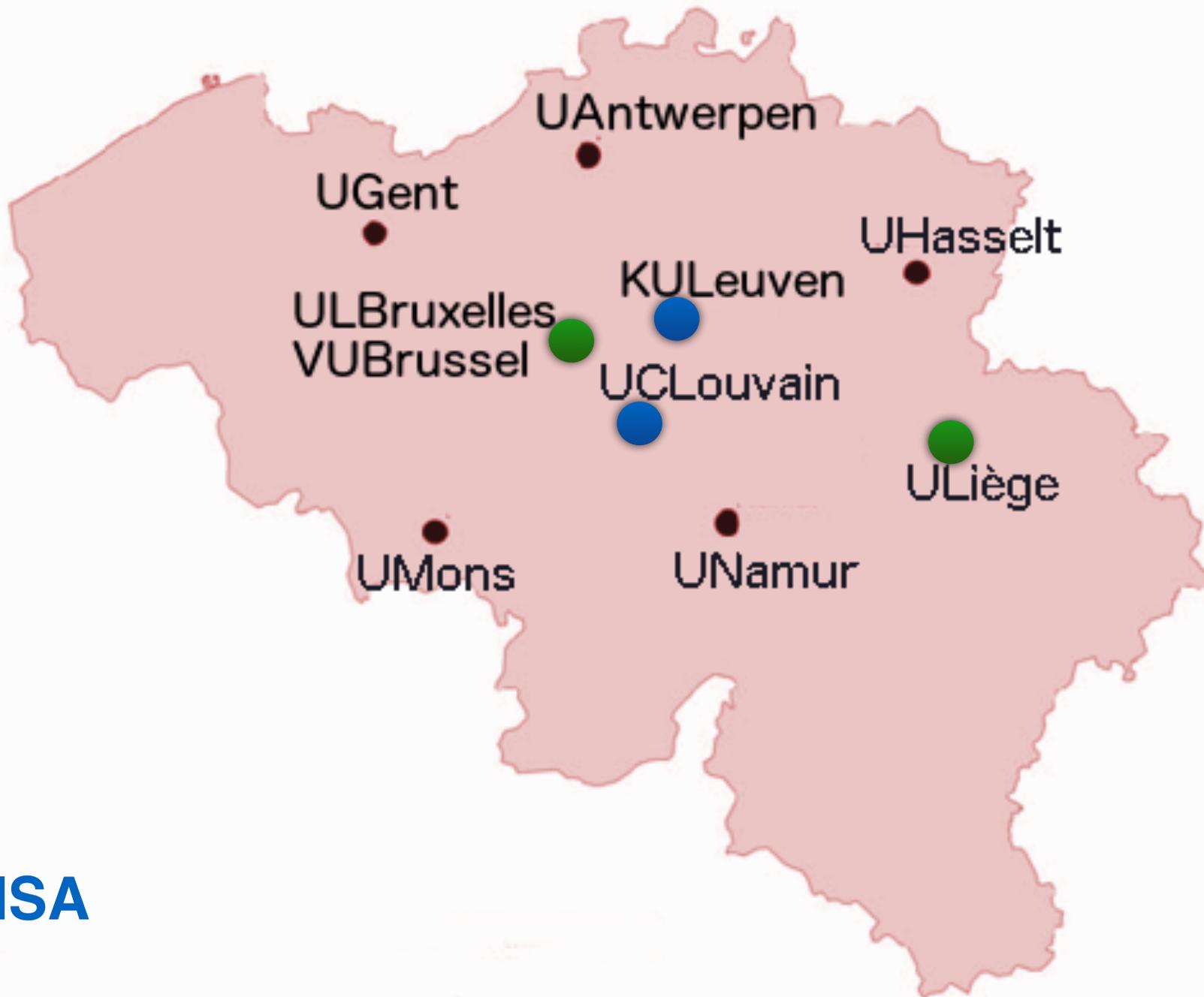
Universities



Cosmoparticle network



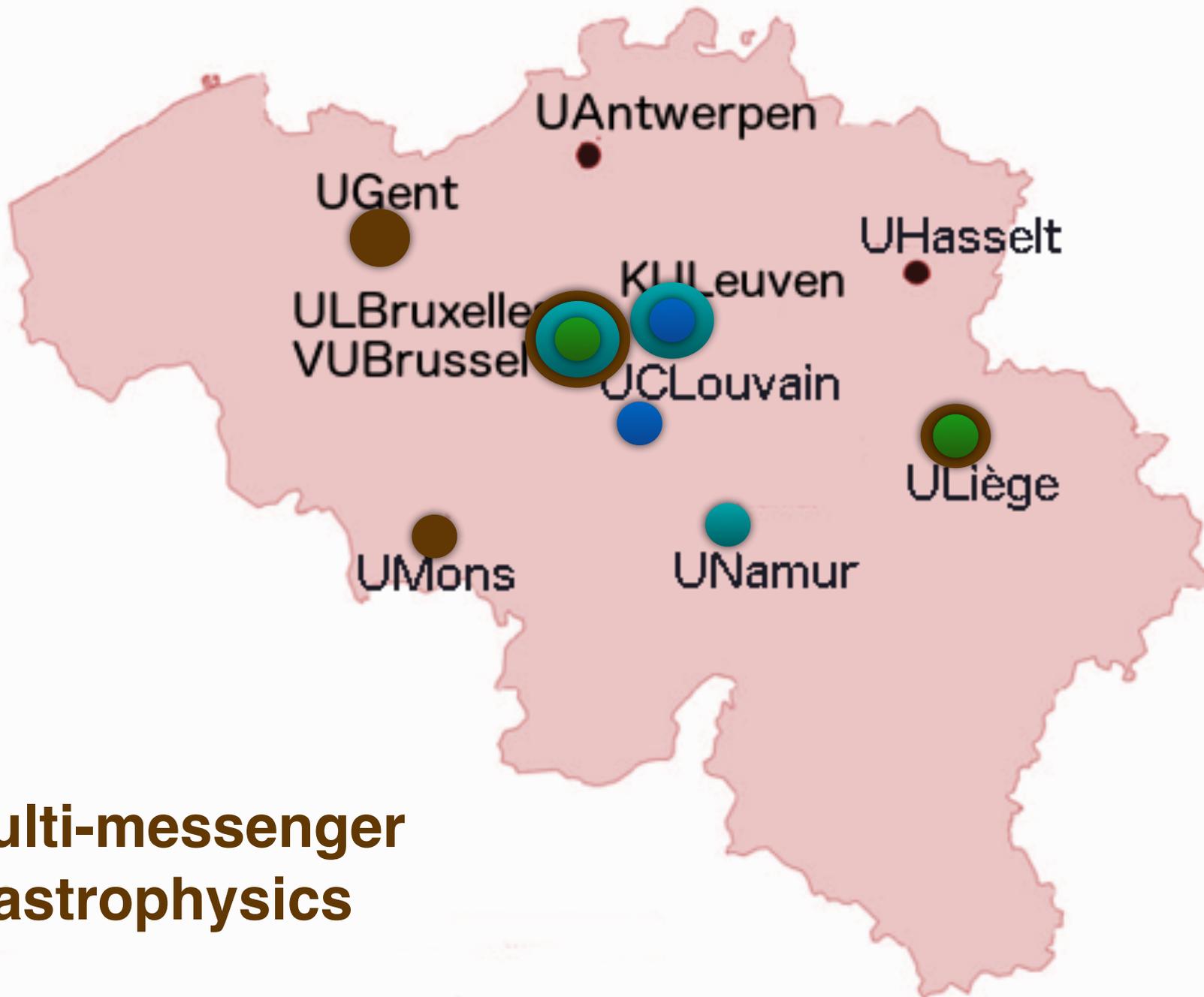
LIGO



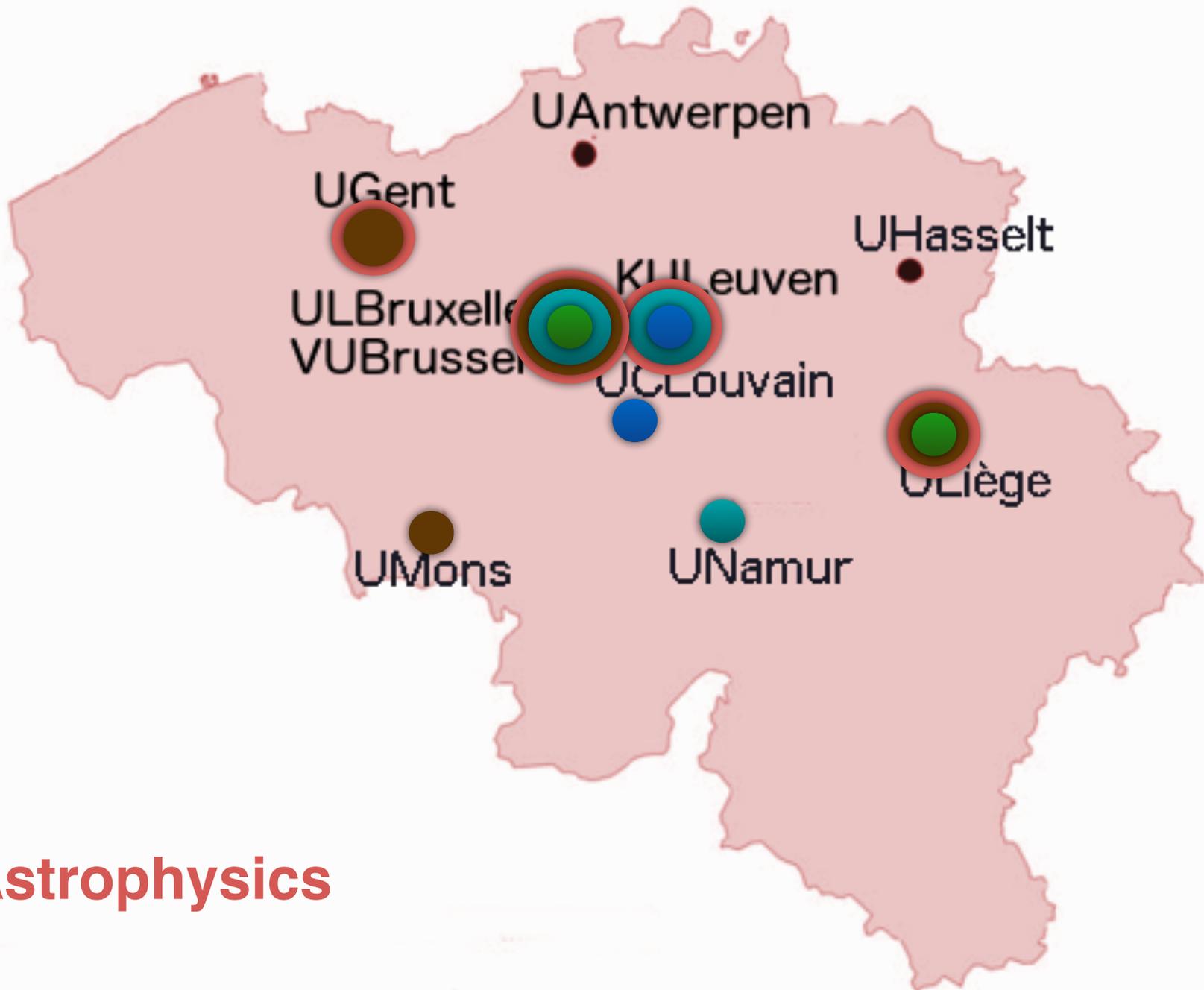
LISA



Gravitation & cosmology



Multi-messenger astrophysics



Astrophysics

The time to act is now!

- sciences
- applied sciences
- industry
- funding agencies

Bert	Vercnocke	Gravitational Wave Center, Institute for Theoretical Physics	KU Leuven
Geert	Degrande	Civil Engineering/ Engineering	KUL
Michel	Van Camp	Seismologie-Gravimetrie	Royal Observatory of Belgium
Vincent	Lemaître	Centre for Cosmology Particle Physics ans Phenomenology CP3/IRMP/SST	UCL
Andrea	Giammanco	Centre for Cosmology Particle Physics ans Phenomenology CP3/IRMP/SST	UCL
Claude	Duhr	Centre for Cosmology Particle Physics ans Phenomenology CP3/IRMP/SST	UCL
Christophe	Delaere	Centre for Cosmology Particle Physics ans Phenomenology CP3/IRMP/SST	UCL
Fabio	Maltoni	Centre for Cosmology Particle Physics ans Phenomenology CP3/IRMP/SST	UCL
Christophe	Ringeval	Centre for Cosmology Particle Physics ans Phenomenology CP3/IRMP/SST	UCL
Jan	Govaerts	Centre for Cosmology Particle Physics ans Phenomenology CP3/IRMP/SST	UCL
Krzysztof	Piotrkowski	Centre for Cosmology Particle Physics ans Phenomenology CP3/IRMP/SST	UCL
Eduardo	Cortina	Centre for Cosmology Particle Physics ans Phenomenology CP3/IRMP/SST	UCL
Jean-Marc	Gérard	Centre for Cosmology Particle Physics ans Phenomenology CP3/IRMP/SST	UCL
Marco	Drewes	Centre for Cosmology Particle Physics ans Phenomenology CP3/IRMP/SST	UCL
Giacomo	Bruno	Centre for Cosmology Particle Physics ans Phenomenology CP3/IRMP/SST	UCL
Clément	Lauzin	Institute of condensed matter and nanosciences	UCL
Dirk	Ryckbosch	Physics and Astronomy	UGent
Stephane	Detournay	Fundamental and Mathematical Physics	ULB
Arnaud	Deraemaeker	BATir	ULB
Ioana	Maris	Astroparticle Physics (Auger, IceCube)	ULB
Laurent	Favart	IIHE-ULB director (IceCube, Auger)	ULB
Michel	Tytgat	Service de Physique Théorique	ULB
Petr	Tinyakov	Service de Physique Théorique	ULB
Laura	Lopez Honorez	Service de Physique Théorique	ULB
Nicolas	Chamel	Institut d'Astronomie et d'Astrophysique	ULB
Alain	Jorissen	Institut d'Astronomie et d'Astrophysique	ULB
Stephane	Goriely	Institut d'Astronomie et d'Astrophysique	ULB
Sophie	Van Eck	Institut d'Astronomie et d'Astrophysique	ULB
Frédéric	Robert	Embedded Electronics/BEAMS/Ecole Polytechnique de Bruxelles	ULB
Geoffrey	Compère	Fundamental and Mathematical Physics	ULB
Christophe	Collette	Precision Mechatronics Laboratory	ULB andULiège
Jean-René	Cudell	STAR Intitute/fundamental interactions	ULiège
Gregor	Rauw	STAR Intitute	ULiège
Nazé	Yaél	STAR Intitute	ULiège
Michaël	De Becker	STAR Intitute	ULiège
Jérôme	Loicq	CSL&Applied sciences	ULiège
Frédéric	Nguyen	Applied Geophysics/UUE/Engineering	ULiège
Alain	DAssargues	Hydrogeology and Env. Geology/UUE/Engineering	ULiège
Hans-Balder	Havenith	Georiks_ and_ Environment/Geology/Sciences	ULiège
André	Füzfa	naXys	UNamur
Pierre	Van Mechelen	Particle Physics group	University of Antwerp
Alexander	Sevrin	Theoretical High Energy Physics Group (TENA)	Vrije Universiteit Brussel
Ben	Craps	Theoretical High Energy Physics Group (TENA)	Vrije Universiteit Brussel
Nick	van Eijndhoven	Astroparticle Physics (IceCube)	VUB
Jorgen	D'Hondt	IIHE-VUB director (on behalf of IIHE-VUB)	VUB
Stijn	Buitink	Astronomy & Astrophysics	VUB