LVK Communications

Susanne Milde, AEI/Milde Science Comms, June 30th 2022

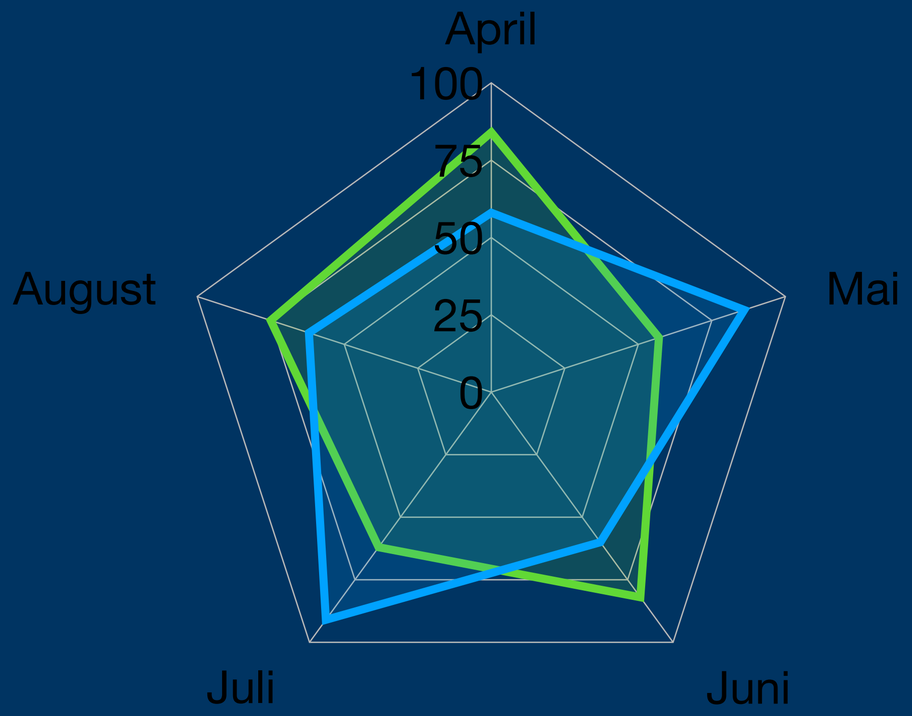
AGENDA

- Science Communications: Why, how and what?
  Tools and essential steps

- Science Communications for LVK - exchange of information and experiences, brainstorming

Science Communications

- Outreach
- Education
- Media actives
- Lobby work
- Internal communications



Local, regional, national

International

SCIENCE COMMUNICATIONS – WHY?

Crucial if we want to be successful in

- getting recognized,
- getting funded,
- attracting the best researchers to the field

Additionally

- Inform the public about LVK research
- Increase the public knowledge and understanding of (fundamental) research

The Process

Definition of basics:
Goals, target groups, key messages

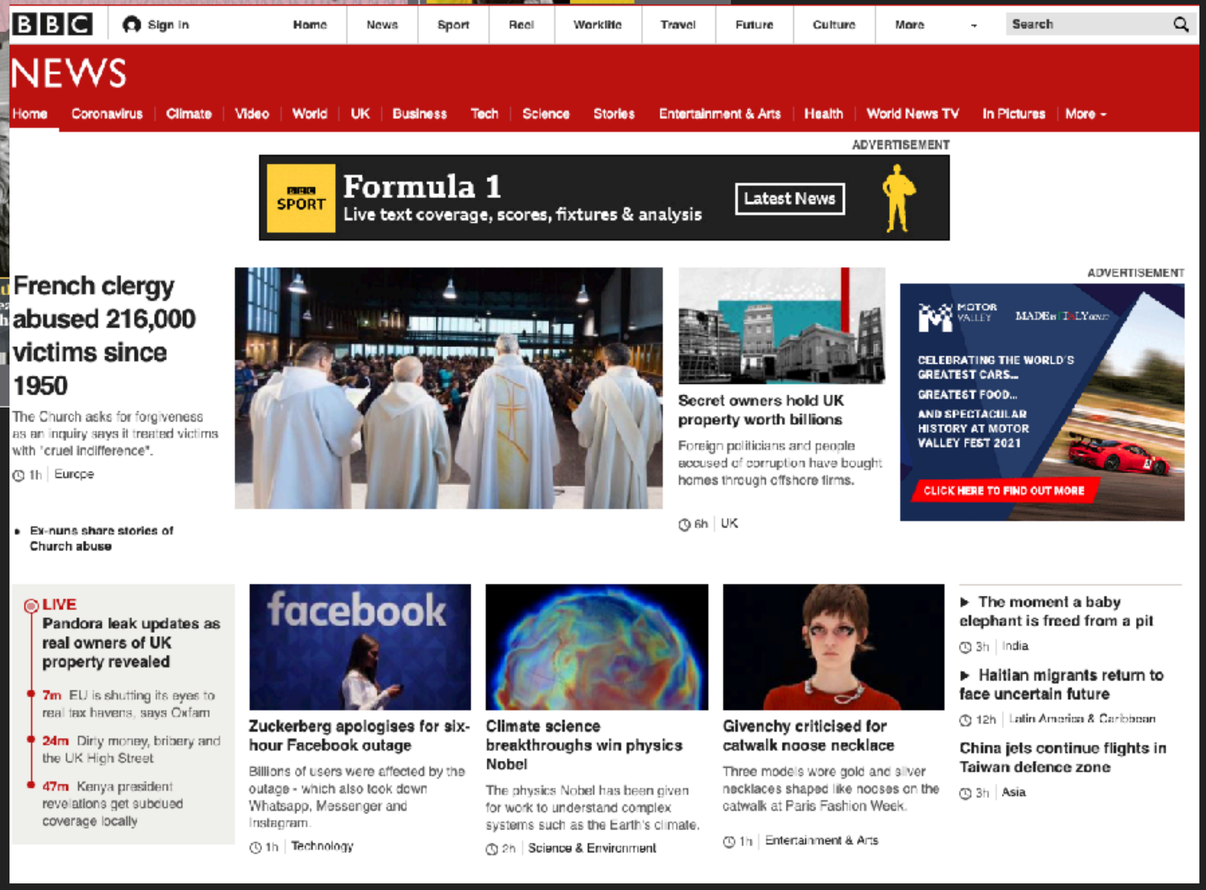
Development of an overarching strategy

Realisation including coordination

Evaluation and adjustment

Examples

MEDIA: OFF- AND ONLINE



SOCIAL MEDIA

New LISA Instagram Account

Photo post + caption with further information, hashtags & links to learn more

Categories: LISA Sources, LISA Science Goals, LISA Signals, LISA Instrumentation

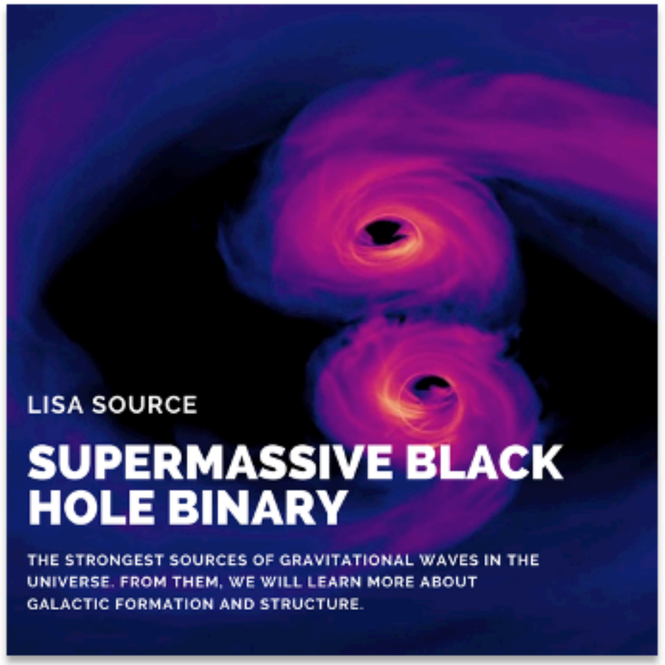


Image Credit: NASA

ONLINE INFORMATION

MAX PLANCK INSTITUTE
FOR GRAVITATIONAL PHYSICS
(Albert Einstein Institute)

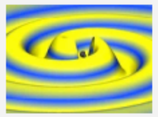
INSTITUTE | RESEARCH | CAREER | NEWS ROOM

Home > Research

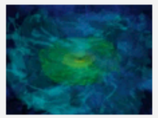
Research at the Albert Einstein Institute

The Max Planck Institute for Gravitational Physics (Albert Einstein Institute/AEI) is one of the world's leading centers for gravitational physics with a unique breadth and depth of its approach to the subject. Scientists at the AEI focus on all aspects of Einstein's theory of general relativity. The research topics range from the theoretical, observational and experimental aspects of gravitational-wave physics and astrophysics, to unification of general relativity and quantum mechanics, all the way to geometrical and analytical aspects of the theory. The AEI has two branches, one in Potsdam, and one in Hannover where it is closely related to the Leibniz Universität Hannover.

Departments



Astrophysical and Cosmological Relativity (Potsdam)
Director: Prof. Dr. Alessandra Buonanno
The *Astrophysical and Cosmological Relativity* department develops accurate analytical and numerical models of gravitational-wave sources, and uses them to analyse data, improving our ability to extract unique astrophysical and cosmological information from the observed signals, and testing Einstein's theory of general relativity. > more



Computational Relativistic Astrophysics (Potsdam)
Director: Prof. Dr. Masaru Shibata
Research in the department *Computational Relativistic Astrophysics* covers mergers of binary neutron stars and mixed binaries as well as stellar core collapse that form black holes. The department also focuses on studying more fundamental aspects of General Relativity using numerical tools. > more

Laser Interferometry and Gravitational Wave Astronomy (Hannover)
Director: Prof. Dr. Karsten Danzmann
The department *Laser Interferometry and Gravitational Wave Astronomy* focuses on the development of gravitational wave detectors on Earth as well as in Space. This comprises also a full range of supporting laboratory experiments in quantum optics and laser physics. > more

"Geodetic" redirects here. For other uses, see Geodetic (disambiguation).

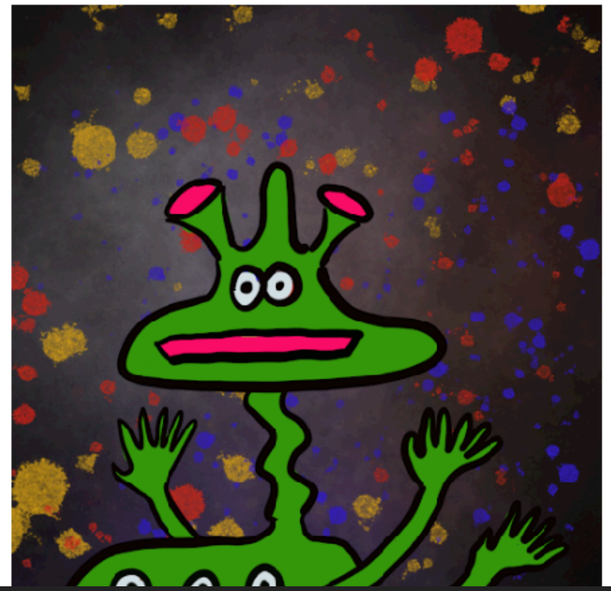
This article has multiple issues. Please help to **improve it** or discuss these issues on the **talk page**. [hide]
(Learn how and when to remove these template messages)

- This article includes a list of general **references**, but it remains largely unverified because **it lacks sufficient corresponding inline citations**. *(February 2009)*
- This article **needs additional citations for verification**. *(December 2018)*
- This article's **lead section may not adequately summarize its contents**. *(June 2018)*

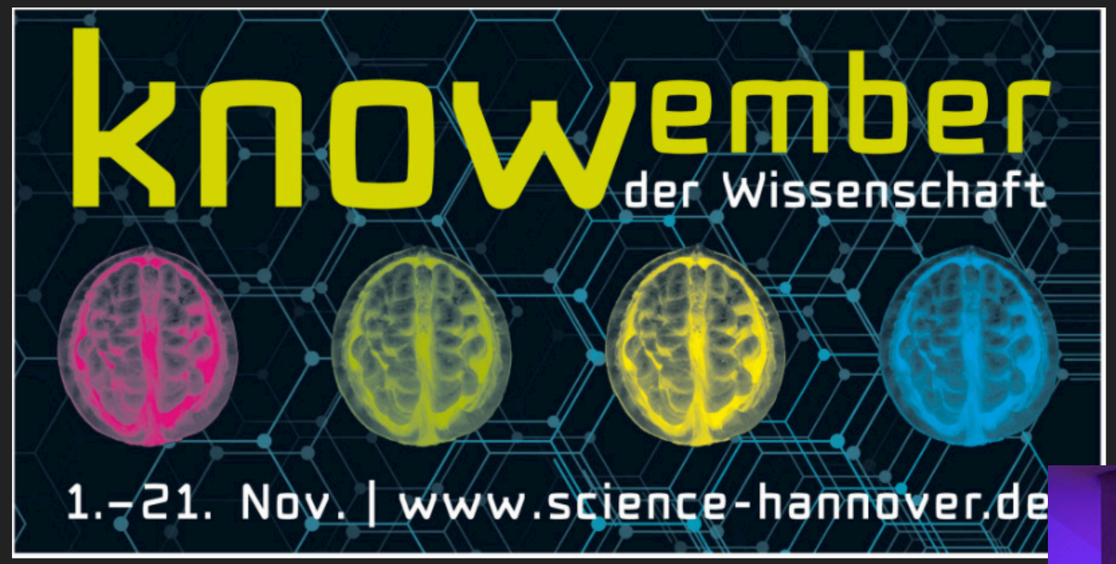
Geodesy (/dʒiːˈɒdɪsi/[1] *jee-OD-ih-see*) is the Earth science of accurately measuring and understanding Earth's geometric shape, orientation in space, and gravitational field.[2] The field also incorporates studies of how these properties change over time and equivalent measurements for other planets (known as planetary geodesy). Geodynamical phenomena include crustal motion, tides and polar motion, which can be studied by designing global and national control networks, applying space and terrestrial techniques

HUMANS OF LIGO SEARCH

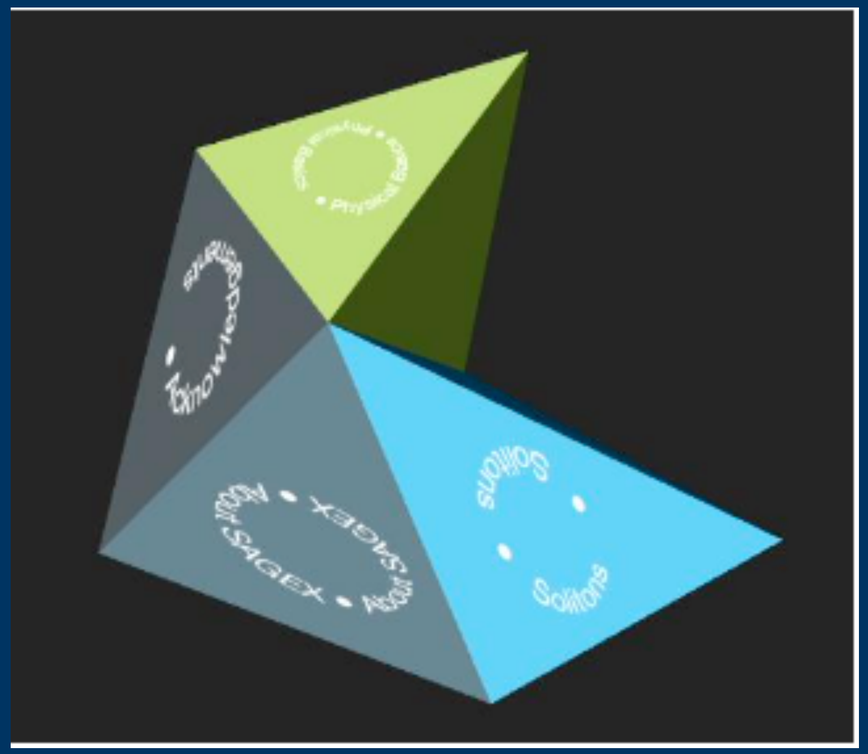
LATEST POSTS

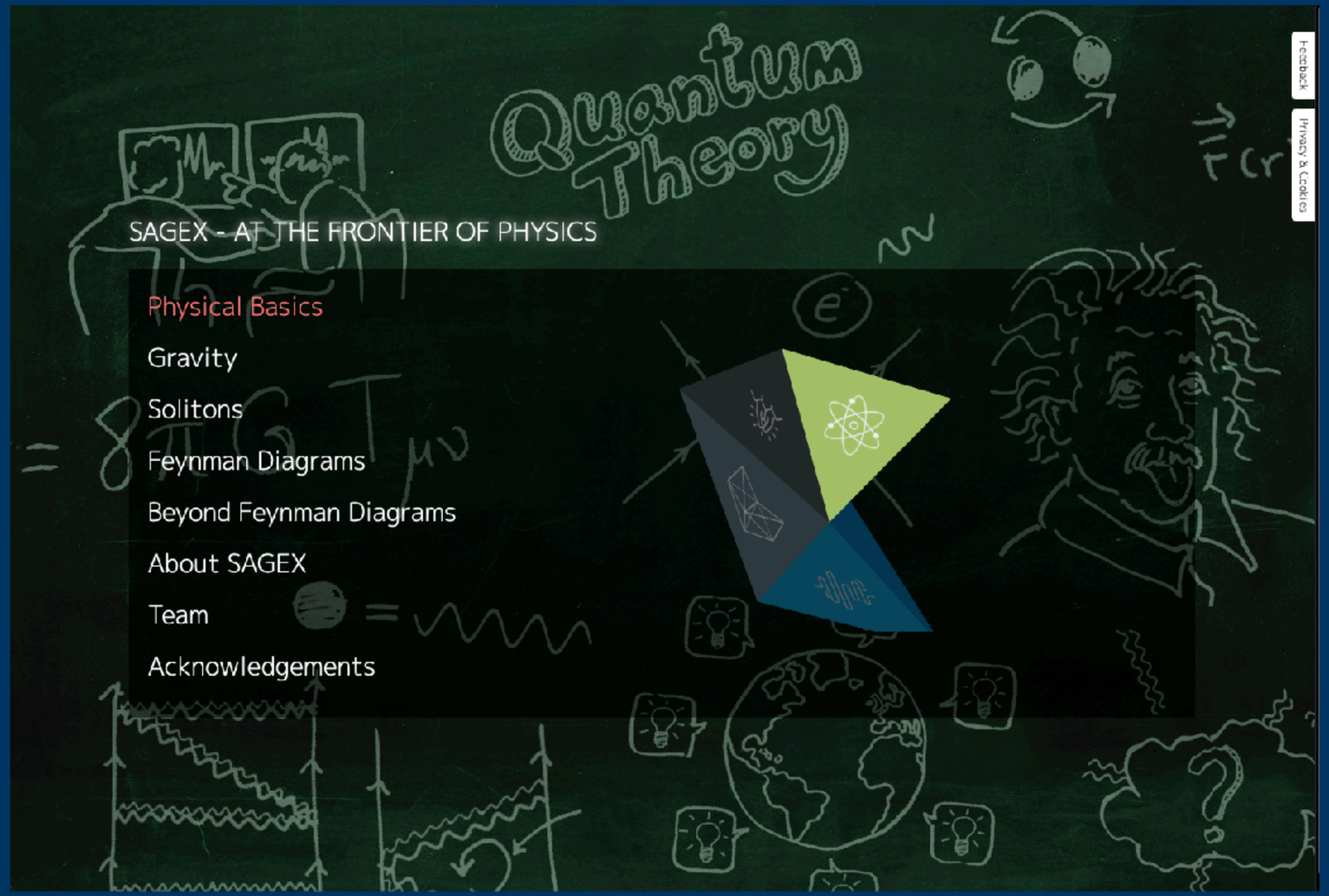


Outreach Activities



https://exhibition.sagex.org/#/exhibition-hub



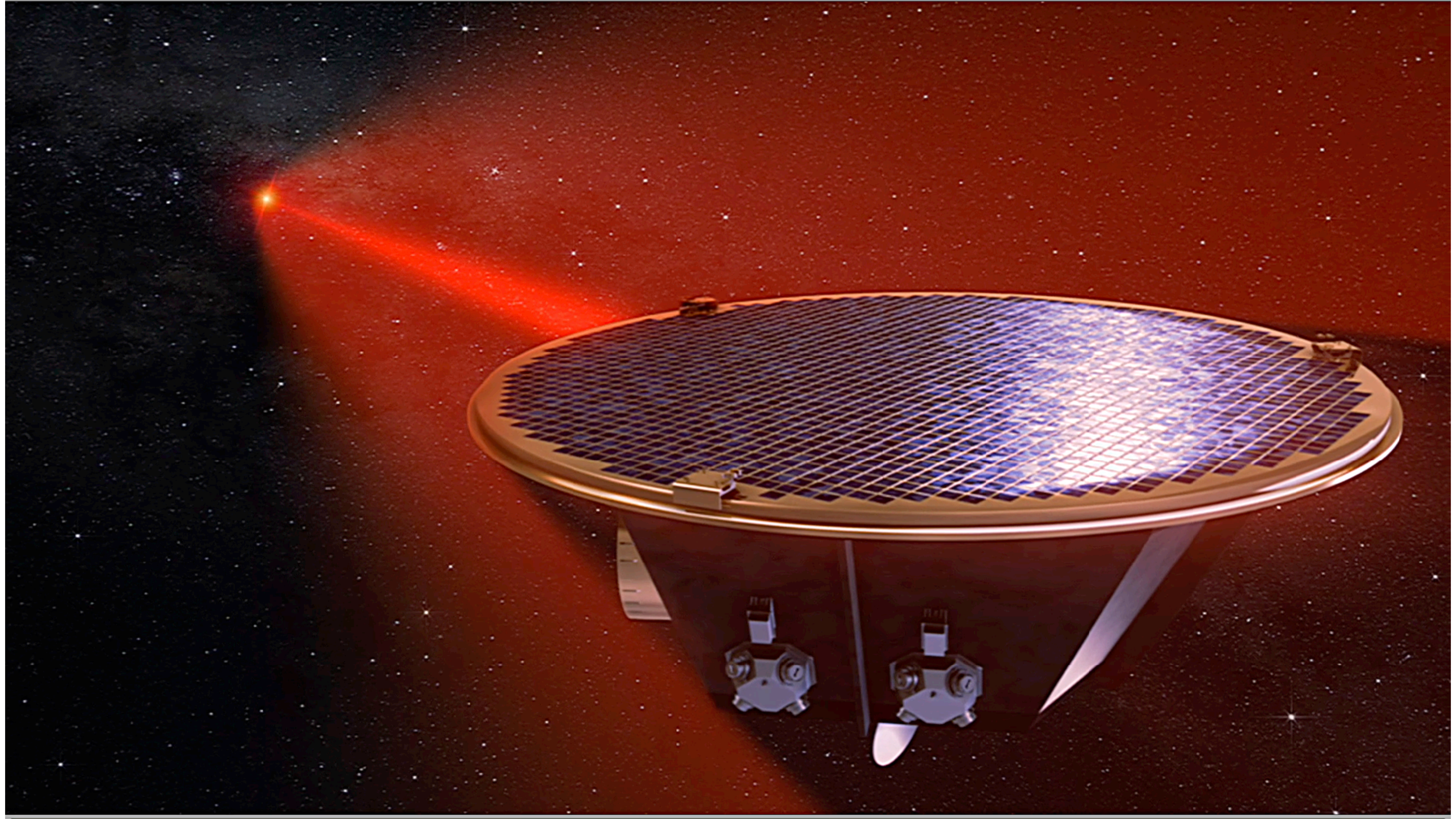


Materials

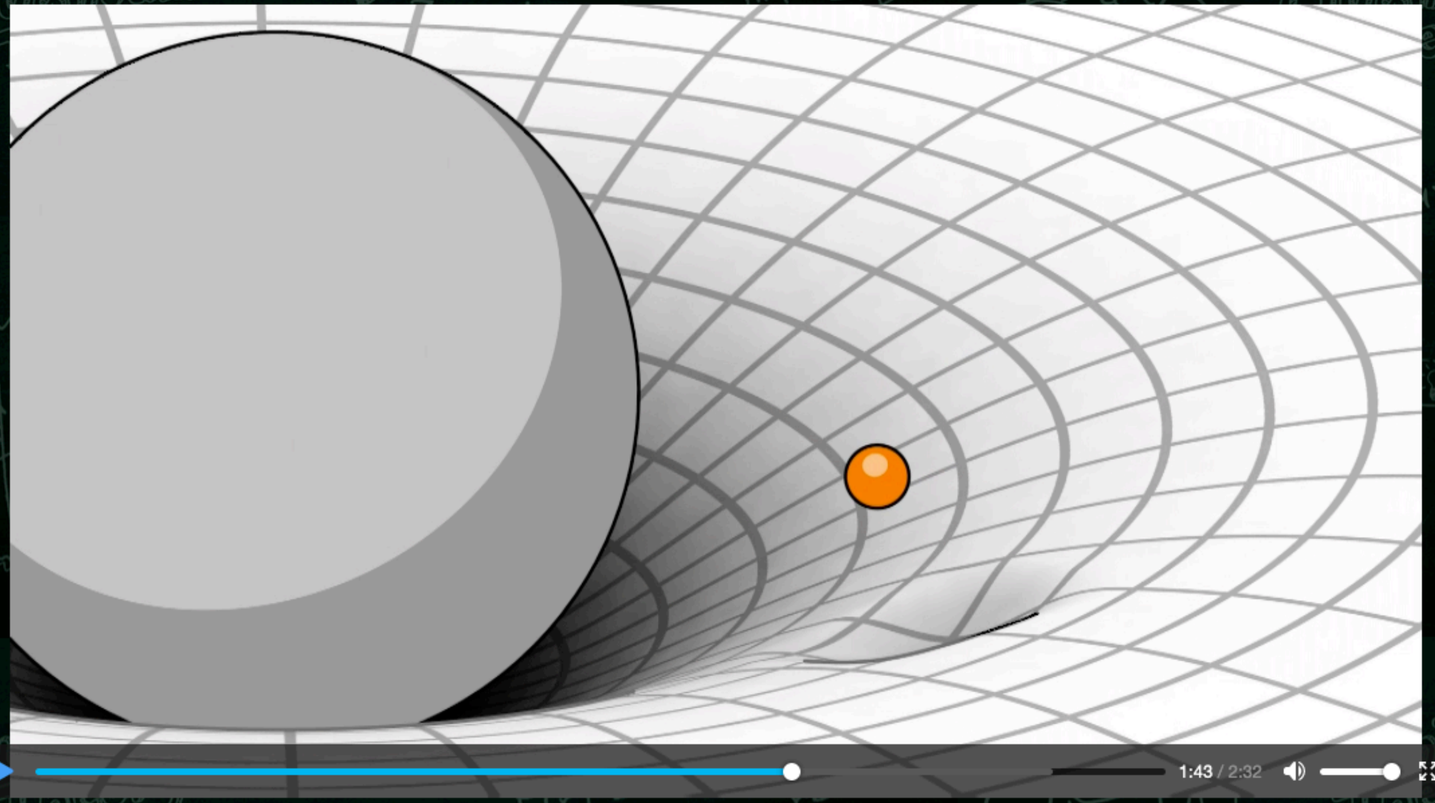
Content

based on —> goal, target groups, key messages

- The story
- Texts, images, animations
- Skilled experts



THEORIES OF GRAVITY



What is spacetime?

From our everyday lives that one can move in three different directions in space: forward and back, side-to-side, or

WHY DOES THE SUN SHINE?

The Sun is an ordinary middle-aged star, one of 100+ billion stars in our Galaxy alone. The Sun consists largely of hydrogen (a nucleus made of one proton) and helium (two protons, two neutrons). These, the lightest elements, are thought to have been made in primordial processes, just minutes after the Big Bang, nearly 14 billion years ago. Such primordial gas gradually condensed through gravity into massive incandescent balls of gas – the first stars.

In stars, tremendous pressure and heat drive the nuclear-fusion reactions of hydrogen nuclei to produce more helium, as well as carbon, oxygen, and other nuclei, with the release of huge amounts of energy – the 'nuclear binding energy'. We see the manifestation of this in the sunshine and warmth that sustains life, but also in the variety of elements around us – the oxygen we breathe, the carbon that is the basis of life as well as fossil fuel.

When the fuel of nuclear fusion in their cores runs out, stars like our Sun eventually blow off their outer envelopes, and their cores end up as inert and quiescent 'white' dwarfs. Stars that are much more massive, on the other hand, eventually collapse under their own gravity, and most of them explode as a supernova, throwing out material far into space.

Within the supernova, violent nuclear processes between transient exotic nuclei lead to the synthesis of more of the important elements that shape our life ('nucleosynthesis'). Such supernovae make the calcium in our bones, the oxygen we breathe, the iron in our blood, and rare and precious elements such as gold, platinum or uranium.

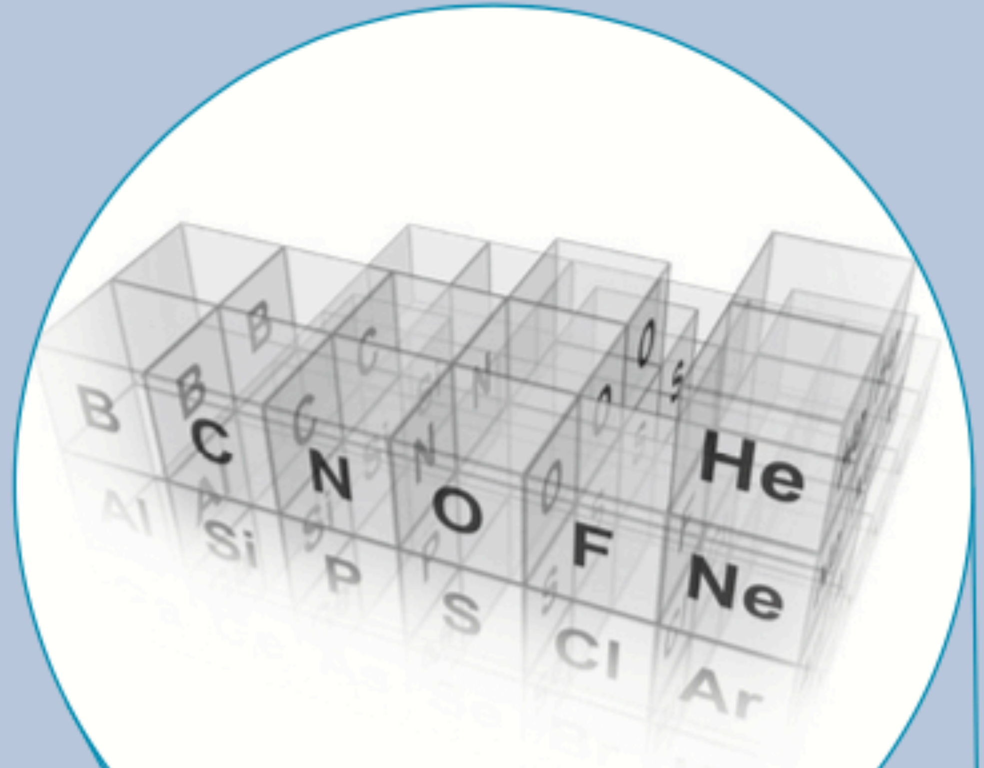
Eventually, the material dispersed by this catastrophic end of a star cools and condenses into new stars, perhaps with accompanying planets that could support life. We are, indeed, the children of stardust!

Nuclear astrophysicists investigate the processes underlying the creation of the elements and their influence on broader cosmic phenomena in gas, stars, galaxies, and in their evolution.

__Background:__ This image from the Wide Field Imager on the MPG/ESO 2.2-metre telescope at ESO's La Silla Observatory in Chile shows the bright open star cluster NGC 2547. Between the bright stars, far away in the background of the image, many remote galaxies can be seen, some with clearly spiral shapes.

THE ELEMENTS AND THEIR ISOTOPES: MADE BY NUCLEAR REACTIONS

In atomic nuclei, protons and neutrons are bound together by the strong nuclear force against the electrostatic repulsion of the electric charge of protons. A nucleus is very compact, and ten thousand times smaller than the electron cloud that determines the size of the atom. The charge of the electron cloud determines the characteristic chemical properties of each element. The different number of neutrons that can be bound to the same number of protons make up the variety of isotopes, and these determine the characteristics of nuclear reactions. These reactions re-arrange the mix of protons and neutrons, thus creating new isotopes from existing ones. In cosmic environments, nuclear reactions often involve unstable and rare isotopes. Thus, from the primordial elements hydrogen and helium, elements such as carbon, oxygen, iron, and gold, and all their isotopes, are made.



A three-dimensional periodic table showing the various isotopes of the elements along the third axis.

IUPAC Periodic table of the elements

Key: atomic number / Symbol / name / conventional atomic weight / standard atomic weight

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57-71 lanthanoids	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89-103 actinoids	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Nh	114 Fl	115 Mc	116 Lv	117 Ts	118 Og

57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY