



Universidad Católica del Norte
Departamento de Física



lawphysics

Latin American Webinars on Physics

The **lawphysics** initiative as a tool to communicate research in physics

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In collaboration with:

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Mauro Cambiaso (U. Nacional Andrés Bello)

Workshop Sustainable HEP – 28-30 June 2021

Motivation



*“The problem of teaching physics in Latin America can also be generalized in another way, to remind us of **the problem of doing anything in Latin America**. We must get at least partly involved in the special **social, political, and economic problems** that exist here.”*

Richard Feynman in the First Inter-American Conference on Physics Education in Rio de Janeiro in June 1963

Nowadays, the situation has improved but there are still **problems**.

1. *Students are all alone*

2. *Small number of people is involved*

... similar problems occur with **researchers**

Problems to tackle

In Latin America, there are many issues acting against science:

- Small groups of scientists e.g. physicists
- Geographically far from world class research centers
- Reduce funding
- Teaching and administrative duties
- Loss of contact with LA collaborators



Lawphysics: Latin American Webinar on Physics

Goal

Making research **accessible** no matter the place

Speakers

Researches from all over the world

Format

40 min talks Zoom and Youtube



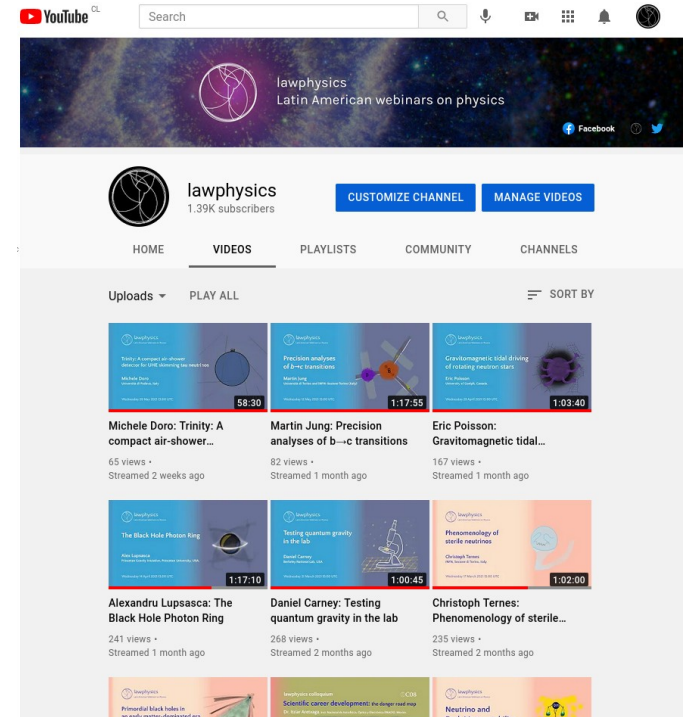
Lawphysics: Latin American Webinar on Physics

Topics

- High Energy Physics
- Astroparticles
- Cosmology
- Gravitational Waves
- and others

Since 2015

- **115** Webinars
- **6** Colloquia
- **1** Dark Matter Day



Advantages

For the speaker

- Reach a large audience
- Recorded talks are public
- Certificate
- Promote early-career scientists

For the audience

- Broad topics
- Access to all webinars
- Possibility to replay
- See faces

Answer to 1: Demonstrating that the photon ring diameter is measurable in principle. Gralla, Lupe, 2008
 We did this for ~100 source models. Alex Lupsasca

(Fourier transform of narrow feature)
 $|V| \approx \frac{1}{\sqrt{u}} \sqrt{(\alpha_\phi^2)^2 + (\alpha_\theta^2)^2 + 2\alpha_\phi^2 \alpha_\theta^2 \sin(2\pi u_\phi u)}$

Fitting wiggles to formula gives d_ϕ .

- Robust to range of u used for fit
- Measured d_ϕ is always an ellipse—regard this as GR prediction for M87*.

IVI compatible with EHT observations IVI wiggles on long baselines

Non unitary neutrino mixing

T2K bound stronger due to better measurement of mixing angle

$$P_{\mu\mu} = \alpha_{22}^4 P_{\mu\mu}^{\text{st}} + \alpha_{22}^3 |\alpha_{21}| P_{\mu\mu}^{\text{I}} + 2|\alpha_{21}|^2 \alpha_{22}^2 P_{\mu\mu}^{\text{I}^2}$$

90, 99% CL

Forero, Giunti, Ternes, Tórtola, 2103.01998

Metrics

~ **1.4 K** subscribers

Last 365 days:

~**22 K** views

~**4K** Public watch hours

Viewer gender

19% female

81% male

Viewer age

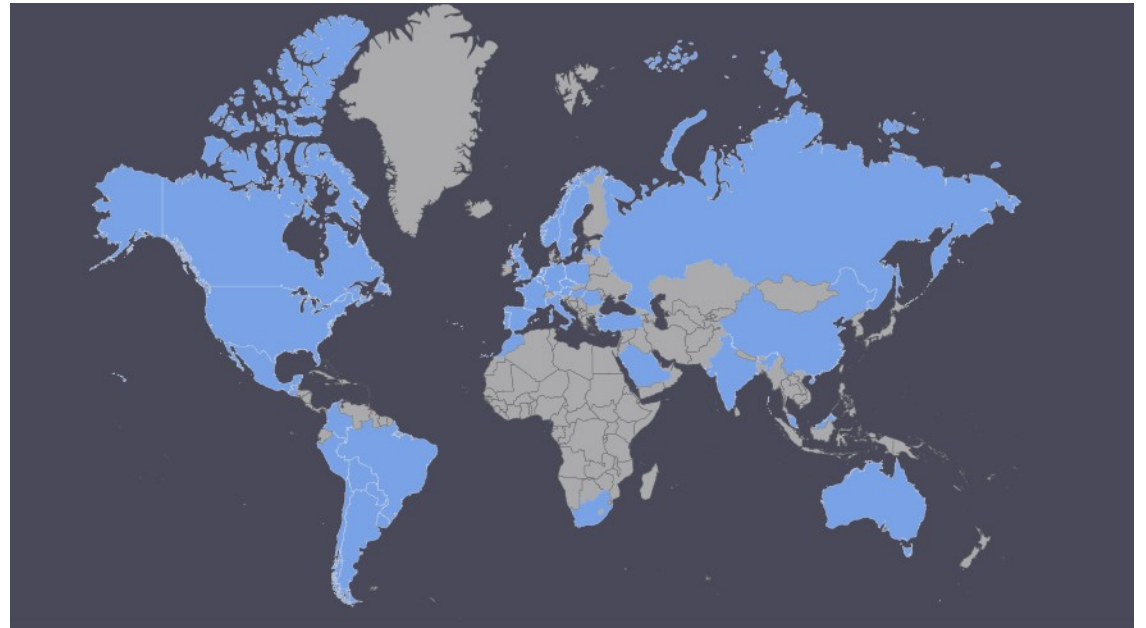
16% 15-24 years

38% 25-34 years

20% 35-44 years

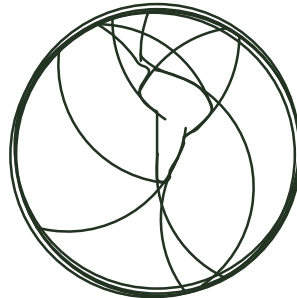
17% 45-54 years

8% 55-64 years



Conclusions

- **Webinars** are an incredible tool for **communicating** science and research.
- A webinar cycle has to have clear objectives.
- **Lawphysics** has been continuously working since 2015.
- Lessons about **know-how** were learned before current **COVID19 pandemic** and they have been useful to keep communicating.



Got curious?

Current Team

Nicolás Bernal (UAN)

Alejandro Cárdenas Avendaño (UKL, UIUC)

Joel Jones-Perez (PUCP)

Roberto A. Lineros (UCN)

Water Tangarife (LUC)

Mauro Cambiaso (UNAB)

Former Members

Jorge S. Diaz

Alejandro de la Puente

Camilo Garcia-Cely

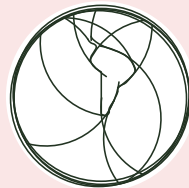
German A. Gomez Vargas

Fabio A. Pereira dos Santos

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