

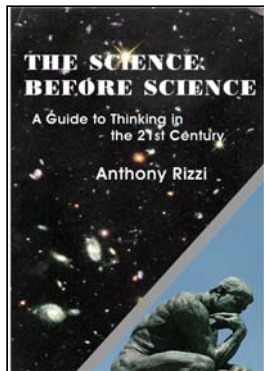


THE INSTITUTE FOR ADVANCED PHYSICS

The Institute News

- DiCarlo *Science Before Science* study group concludes
- Completion of the 6th year of the college study group
- Special Relativity lectures just released on IAP website
- 2024 total solar eclipse and 1919 eclipse verifies Einstein’s theory
- EWTN re-airs *The Science Before Science* series

DiCarlo *Science Before Science* Study Group Concludes



The *Science Before Science* (SBS) study group led by IAP Membership Director Anthony DiCarlo that began in the Fall concluded at the beginning of July 2024.

Mr. DiCarlo was assisted

in leading this group by IAP Associate Members Maikel Garcia and James Scheuer. The group met once every other week via Zoom to go over the reading assignments, ask questions, and have conversations about the material. As always, there were many good questions asked and lots of edifying and

illuminating conversation had, and, as a result, new friendships forged. Group members expressed appreciation for all that they learned and the desire to go through the study group again if possible. One group member said that, for her, it was “life changing”. If you or someone you know would like to get plugged into a study group like this one, please email us at info@iapweb.org.

You may purchase this groundbreaking book by using the link provided here: https://www.amazon.com/Science-Before-Guide-Thinking-Century-dp-1734015217/dp/1734015217/ref=dp_ob_title_bk

(Please copy and paste the URL into your browser if clicking the link does not work.)



Left Anthony DiCarlo

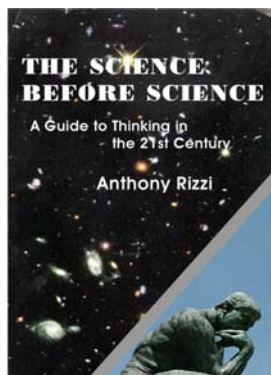
Middle Maikel Garcia

Right James Scheuer



Completion of the 6th year of the college study group

By Giuseppe Rizzi, Associate Member



The College *Science Before Science* group finished its 6th year this spring with a group of highly enthusiastic college students and recent graduates. The group members came from a wide range of backgrounds, from

psychology majors to physics majors, and a variety of schools across the country, from Oregon State University all the way to MIT (in Cambridge, MA). The group membership reached as far as an international student from South Korea! Everyone enjoyed learning *The Science Before Science* material that grounds each of their majors in the foundational physics. Many students are working to regularly integrate what they learned into the habits of their everyday lives; Dominique, who just finished her 2nd year with the group, said “It helped me understand the world around me and the beauty that’s there. It helped me see the world like how I did when I was a kid again.” To see more, go to this video: <https://www.youtube.com/watch?v=FR5ykXsH5WA>

The group will start up again with a new cohort in the fall, with many returning students. Going through the study group and the book multiple times is very helpful, as group members learn more with each new time going through the material and with the new perspectives they gain as they move to new stages of their lives.

\$20,000 goal met for Matching Donations

Your donations between March 1st and March 9th exceeded our \$20,000 goal!

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Our anonymous donor donated \$20,000 to double your generosity!

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IAP special **TWENTY YEAR** anniversary celebration (2003-2023)!

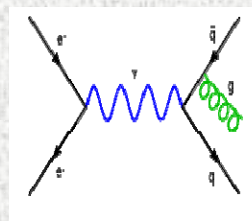
The Institute for Advanced Physics presents its 22nd annual conference

Quantum Field Theory VI

Louisiana State University
by invitation only

July 17 – July 20, 2024

with a special SBS parallel conference for family members



Just Released

Special Relativity lectures

available on IAP website

<https://www.youtube.com/watch?v=tzxfOPE2EA4&list=PLZMfBHXZZsLC9PzC695cWgYWxI4d3Ya8&index=41>

Free Physics Lectures
On the IAP web site

<https://iapweb.org/resources.htm>

QM lectures available on
IAP website

<https://www.youtube.com/playlist?list=PLZMfBHXZZsLB-edsTN2A4je59CTgHlIkr>

Online Physics Lectures

Physics for Realists: Mechanics

(by Dr. Murray Daw)

- [Learn More about PFR M](#)

- [Lecture on Chapter 2](#)

Supplemental Lectures

- [Special Relativity](#), *(by Dr. T. Dickel and F. Williams)*

Physics for Realists: Electricity and Magnetism

(by Dr. Murray Daw)

Physics for Realists: Quantum Mechanics

(by Dr. Murray Daw)

Quantum Field Theory *(empiriometric only)*

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Audio now available for Dr. Rizzi's article

How a Neglect of Physics Has Turned Christianity into a Myth for Modern Man

Come learn how the decline of Christianity
is being caused by our ungrounded
understanding of physical nature.

<https://iapweb.org/theologica.html>



On April 12th, Dr. Rizzi met with Msgr. Michael Schmitz and his secretary. Msgr. Schmitz is Vicar General of the Institute of Christ the King Sovereign Priest, as well as the Director of *Divinitas*, a renowned international theological journal which has published Dr. Rizzi's work. He and Dr. Rizzi discussed discoveries that IAP has made in recent years, everything from physics to friendship to the nature of man and woman and also discussed St. Thomas Aquinas and Aristotle.

New IAP Web Page on the 2024 Total Solar Eclipse

Watch a time-lapse of the total solar eclipse on April 8, 2024 in Dallas

IAPweb.org/magazine#eclipse

1919 eclipse verifies Einstein's theory



Figure 1: Stars, circled in green, without sun present (facsimile reproduced digitally in April/May 2024). Star light not bent.

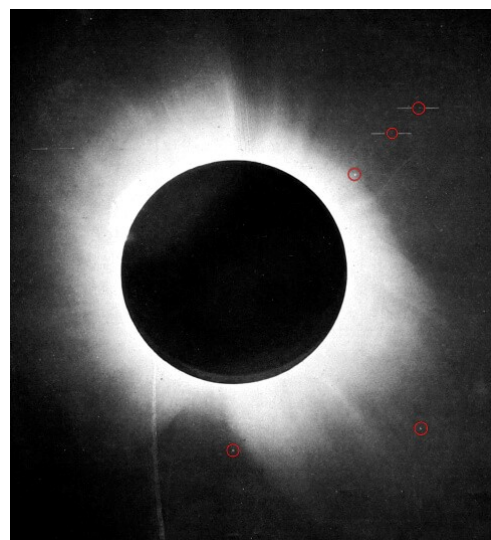


Figure 2: 1919 eclipse with light from stars (from original paper⁶), circled in red. Sun bends starlight.

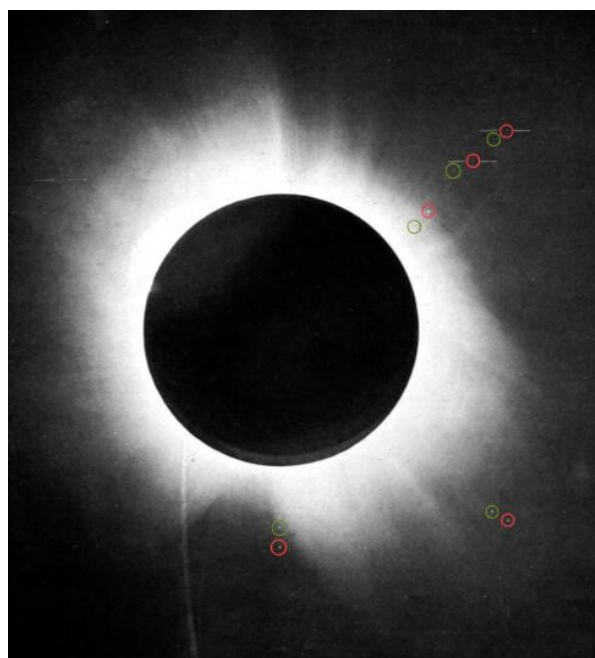


Figure 3: Overlay of the above two plates, showing the deflection of the star light

General relativity, proposed by Albert Einstein, predicts that the path of light bends when passing near a massive body. Although the deflection of light near massive bodies could be guessed at using Newtonian mechanics¹, Einstein's theory demanded it. Einstein made his prediction in November 1915² after modifying an initial 1911 prediction³ of his own, upon obtaining the 1915 equation discovered by Karl Schwarzschild for the gravitational field around a spherical body:

$$ds^2 = -\left(1 - \frac{2GM}{r}\right) dt^2 + \left(1 - \frac{2GM}{r}\right)^{-1} dr^2 + r^2 d\theta^2 + r^2 \sin^2 \theta d\varphi^2$$

The image below depicts the light from a distant star bending around the sun and reaching the earth.

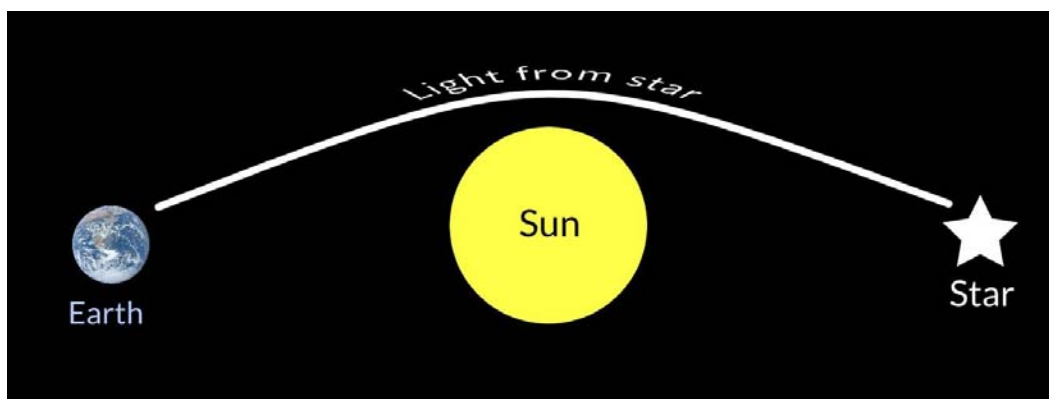


Figure 4: Light from a star bending around the sun and reaching the earth⁴. Image not drawn to scale.

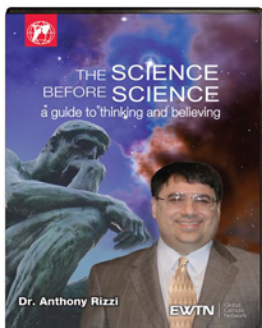
Einstein's prediction was put to the test by physicists Frank Dyson and Arthur Eddington during a total solar eclipse of May 29, 1919. The eclipse, by blocking the sun's light, made visible the light from stars in an especially bright star cluster behind the sun, the Hyades star cluster, which these physicists and their teams photographed during this eclipse, shown in the plate given in Figure 2 above. They compared this to the position of the stars without the eclipse, digitally replicated⁵ in Figure 1. Overlaying the two plates shows the change in position of the starlight, which the physicists found to closely match Einstein's prediction.⁶

By: Anthony Coniglio, Anthony Rizzi

1. Soldner, J. G. v. (1801–1804). "On the deflection of a light ray from its rectilinear motion, by the attraction of a celestial body at which it nearly passes by". *Berliner Astronomisches Jahrbuch*: 161–172.
2. Einstein put forth a series of 4 papers on his general relativity in November 1915, to the Prussian Academy of Sciences: *Grundgedanken der allgemeinen Relativitätstheorie und Anwendung dieser Theorie in der Astronomie* (Fundamental Ideas of the General Theory of Relativity and the Application of this Theory in Astronomy); *Zur allgemeinen Relativitätstheorie* (On the General Theory of Relativity); *Erklärung der Perihelbewegung des Merkur aus der allgemeinen Relativitätstheorie* (Explanation of the Perihelion Motion of Mercury from the General Theory of Relativity); *Feldgleichungen der Gravitation* (The Field Equations of Gravitation).
3. Einstein, A. (1911). "On the Influence of Gravitation on the Propagation of Light". *Annalen der Physik*. 35 (10): 898–908.
4. Credits for the photograph of the earth within this diagram are NASA/Apollo 17 crew, taken by either Harrison Schmitt or Ron Evans on December 7, 1972.
5. The following link is the digital drawing program used to create Figure 1 based on Figure 2, as well as to modify Figures

1-3 with circles and to draw the stars circled in green on Figure 3: <https://sketch.io/sketchpad/>

6. Dyson, F. W.; Eddington, A. S.; Davidson C. (1920). "A determination of the deflection of light by the Sun's gravitational field, from observations made at the total eclipse of 29 May 1919". *Philosophical Transactions of the Royal Society*. 220A (571–581): 291–333. Figure 2 above, which is also used to obtain Figure 3, is the positive version of the negative image included in the paper.



2 discs. 2 1/2 hrs.

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<https://iapweb.org/store/kids.html#sbs-dvd>

Institute for Advanced Physics & EWTN present
The Science Before Science: a guide to thinking and believing

5 episode series
re-airing on EWTN in March

Co-hosts Dr. Anthony Rizzi and Marcus Grodi invite you to learn the importance of science, and its proper understanding in context for our sanity in our modern age: the basic fundamentals of proper thinking, upon which all of our thinking and believing rests; and in particular, the need for philosophy, the science before science. Using experiments, animation and a music video, Dr. Rizzi takes you through the first half of his book, *The Science Before Science: A Guide to Thinking in the 21st Century*.

Recognizing that the profound problems in our culture (that are only getting worse and penetrate even good Catholic homes) which reveal deep errors in the way we think can only be over come by a commitment to fundamental truths, the series explores these fundamental truths which are articulated best by Aristotle and, above all, St. Thomas Aquinas and his disciples. *(Originally produced and aired in 2007)*

I would like to bring to your attention the important work of the Institute for Advanced Physics. I have been an active IAP faculty for six years, since its founding. IAP is providing the proper integration of the philosophy and the physics, which is so desperately needed. Physics is the foundational science, without which the others cannot stand. Dr. Rizzi is an exceptional philosopher and his record in physics is also exceptional. He has, for example, done ground breaking, even revolutionary work in his "Science before Science: A Guide to Thinking in the 21st Century" and the textbook "Physics for Realists: Mechanics." Fr. Benedict Ashley, O.P., Prof. of Philosophy, St. Louis Univ. (2009) (Fr. Ashley was an IAP faculty until his death in 2013 at the age of 97)

