Global Journal of Science Frontier Research: A
Physics and Space Science
Volume 25 Issue 4 Version 1.0 Year 2025
Type: Double Blind Peer Reviewed Interenational Research Journal
Publisher: Global Journals
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

Dressing the Shadow for the First Time: A Scientific and Cultural Celebration of the Winter Solstice in Lavras, Brazil

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Abstract- This short communication presents an original educational and cultural initiative organized in Lavras, Brazil, to celebrate the winter solstice through science, art, and local traditions. Inspired by astronomical knowledge and the rich context of Festa Junina, the event invites people to "dress their shadow" at true solar noon—the moment when the Sun reaches its highest point in the sky and casts the shortest shadow. In Lavras, during the solstice, the Sun reaches an altitude of about 45°above the horizon, causing a person's shadow to match their height. Participants place a change of clothes or traditional attire over their shadow and photograph the scene, posting it with the hash tag #solsticiolavras. This initiative creatively connects everyday experience with astronomical concepts and pays homage to ancestral understandings of the cosmos.

GJSFR-A Classification: *LCC: QB47*

Strictly as per the compliance and regulations of:

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For some Indigenous peoples in Brazil, the winter solstice marks the beginning of a new cycle of planting, harvest, and renewal—a reaffirmation of the connection between Earth and sky. This connection is also visible in Lavras, where the solstice coincides with the harvest season on local farms. The project embraces this perspective by recognizing our place in the world not only through scientific awareness, but also through the body, through culture, and through imagination. "Why not dress the shadow and celebrate this encounter? The Sun as energy, the Earth as home and food, and we—recognizing ourselves in the world: as body, as art, and as science."

Main Text

On the winter solstice in the Southern Hemisphere, the Sun reaches its lowest point in the sky at true solar noon. In Lavras, Brazil (latitude ~21.2°S), this results in a solar altitude of approximately 45° above the horizon. This value comes from adding the Earth's axial tilt (23.5°) to the city's latitude (21.2°), since during the solstice the Sun is directly above the Tropic of Capricorn. At this moment, a person's shadow becomes nearly equal in length to their own body — a simple and striking alignment of body, Earth, and cosmos.

Inspired by this natural alignment of sunlight, Earth, and human scale, we launched a public science action titled "Festa Junina do Sol" (June Festival of the Sun). It invites people to observe their shadow on June 20 or 21, at true solar noon, and creatively "dress" it with a set of clothes placed on the ground. The result is a visual celebration of a cosmic phenomenon, blending joy, art, learning, and traditional June cultural expressions.

Participants are encouraged to use festive costumes or everyday clothes, take a photo, and share it on social media using the hashtag #solsticiolavras. The project also includes educational material explaining the Earth's axial tilt (23.5°), the significance of the solstice, and the geometry of light and shadow.

Local cultural elements are central to this action. In Lavras, residents colloquially refer to the slanted Sun as the "Sol tombado" (tilted Sun), while in many Indigenous cosmovisions, the solstice marks the beginning of a new cycle of life, agriculture, and connection with nature.

By aligning scientific knowledge with these cultural narratives, the project offers a more inclusive and engaging way to teach astronomy and environmental science.

Organized by the Department of Physics of the Federal University of Lavras (UFLA), the event draws on a blend of cultural traditions and scientific awareness. Taking place for the first time in 2025, it invites the population to experience the solstice through creative public participation. The Department of Physics coordinates multiple science communication efforts, including the ongoing outreach programs "A Magia da Física e do Universo" and "Festa das Estrelas"—initiatives that integrate teaching, research, and extension. These programs have resulted in several 2024 publications:

1. Luz-Burgoa, K.; Nogales, J. A. C. (2024). Princípios fundamentais que regem o movimento do misterioso duplo cone. *Revista Brasileira de Ensino de Física*, 46, e20230265.
2. Martins, L. G.; Luz-Burgoa, K.; Nogales, J. A. C. (2024). Canonical quantum quantization for interior of black hole and white hole. *Modern Physics Letters A*, 39, 2450184.
3. Bento, F. A. P.; Nogales, J. A. C.; Luz-Burgoa, K.; Martins, L. G. (2024). Concepções sobre o universo finito e infinito e suas contribuições para a educação científica. *Revista Brasileira de Educação*

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em Ciências e Educação Matemática, 8, 31598–378.

This is the first time such a collective action has been proposed and performed in Lavras. The enthusiastic response from schools, universities, and the broader community has sparked interest in replicating the idea in other cities. In 2025, Nepomuceno, a nearby town, joined the movement under the hashtag #solsticionepomuceno.

We believe this initiative exemplifies the power of interdisciplinary public science: it situates astronomy within lived experience, connects knowledge systems, and fosters curiosity through collective joy. By turning the shadow into a canvas, and the solstice into a celebration, the people of Lavras are creating a new tradition that highlights how science and culture can walk hand in hand.