

Multiverso: Rock'n'Astronomy

José Antonio Caballero

Centro de Astrobiología

Madrid, Spain

E-mail: caballero@cab.inta-csic.es

Keywords

Astronomy, Arts, Music, Poetry

Summary

In the last few years, there have been several projects involving astronomy and classical music. But have a rock band ever appeared at a science conference or an astronomer at a rock concert? We present a project, *Multiverso*, in which we mix rock and astronomy, together with poetry and video art (Caballero, 2010). The project started in late 2009 and has already reached tens of thousands people in Spain through the release of an album, several concert-talks, television, radio, newspapers and the internet.

[...] que las estrellas deben ocupar su distancia

para que no se extingan cuando abajo las mire.

[...] that the stars must hold their distance

for not being gone out when I see them from below.

Enrique Morente (*Tarantos griegos*, Pablo de Málaga, 2009)

First movement: Allegro con brio

Imagine that you are an astronomer, and use your fingers only to type in target coordinates at the telescope, reduce images and spectra with IRAF, or write papers for scientific publications like *Astronomy & Astrophysics*, and are unable to play an electric guitar. Yet you also love music, work in front of the computer wearing headphones, and dream of playing with your favourite rock band in a tumultuous concert. Imagine then, that after a “cosmic fluke”, you share the stage with the band whose tunes you have hummed since you were a teenager.

Imagine being a rock star who played a leading role in the best Spanish album of the 90s (*Omega*, with Enrique Morente), that your songs are routinely played by Radio 3 (a Spanish national radio station similar to BBC Radio 2), but that you are never have been able to detect an exoplanet or a galaxy at a high redshift. Yet you love astronomy, regularly observe Moon craters and

the Andromeda Galaxy with your small telescope, and have explained to your daughter why Pluto is no longer a planet. Imagine that you are a musician who, after a “cosmic fluke”, gives a talk that follows one from a Nobel Laureate who discovered the cosmic microwave background radiation.

Such “cosmic flukes” sometimes happen. The musician is Antonio Arias, the leader of the rock band Lagartija Nick; I am the astronomer; and the first person to nimbly climb the stage and warmly congratulate us on our astro-rock show was a cordial, venerable Nobel prize winner named Robert W. Wilson.... Yes, the Wilson of “Penzias & Wilson”!

Second movement: Andante con moto

This is what happened during the closing ceremony of the International Year of Astronomy 2009, in Granada, Spain^{1,2}. There, we mixed space sounds (such as

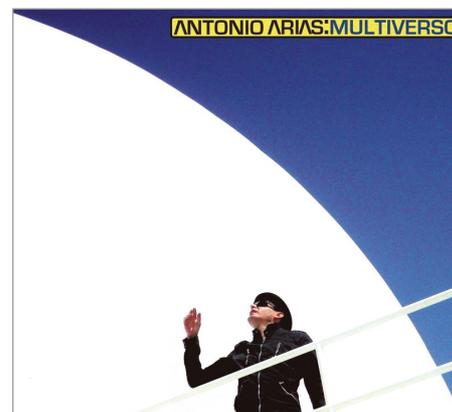


Figure 1. Cover of the album *Multiverso* by Antonio Arias. The white dome is home to the 2.2-metre telescope at the Calar Alto Observatory in Almería, Spain. Credit: A. Arias.

the radar echoes from Titan's surface received by ESA's *Huygens* probe during the last few kilometres of its descent^{3,4}), with a historical lecture on the relationship between music and astronomy illustrated with fancy images and videos, followed by a rock concert given by members of the



Figure 2. Three different moments during the closing ceremony of the International Year of Astronomy 2009 in Granada, Spain: Robert W. Wilson during his talk, “The discovery of cosmic microwave radiation (CMBR)”; the author during the performance of Génesis, a musical track based on a David Jou’s poem on the Big Bang and CMBR; and part of the rock band (Florent, Julián, Antonio and Popi, from left to right) during the performance of Mar de la Tranquilidad. Credit: E. Trinchant.

most famous bands in Granada: Lagartija Nick, Lori Meyers and, of course, Los Planetas⁵ (The Planets).

The whole story had started much earlier. The full version, starting at the very beginning, with Thoth, Euterpe, Urania, Pythagoras, Johannes Kepler, William Herschel, Gustav Holst, David Bowie and Brian May as the main characters, has been already told elsewhere. So I will simply go back to early 2006, when I had just finished writing up my PhD thesis on substellar objects. Each thesis chapter was headed with lyrics, extracts and verses of the songs that I had listened to while I was in front of the computer. While Claude Bertout’s review on T Tauri stars (Bertout, 1989) started with Leonard Cohen’s *Another Night With Telescope*, my chapter headers looked like this:

*¡No hay atmósfera ni viento ni lluvia
sobre el Océano de las Tempestades!
¡Agua para el Mar de las Nubes!
¡Agua para el Mar de los Vapores!*

*There is neither atmosphere nor wind nor
rain
on Oceanus Procellarum!
Water for Mare Nubium!
Water for Mare Vaporum!*

These selenographic verses form the chorus of *Mar de la Tranquilidad*, a Lagartija Nick song from their 1999 album of the same name. There you can also find *Newton-Espacio 1999*, with statements by the Spanish astronaut Pedro Duque, *Pulsar* or *Azora 67*, the only song that I know about fighting light pollution. After receiving my doctorate, I wrote an outreach article on music and astronomy that became a cover story for *Astronomía*, the first popular sci-

ence magazine on astronomy in Spanish (Caballero, 2007). Antonio Arias read the article and liked it. We made contact and I provided him with some astronomical images for the booklet for his next album, *El Shock de Leia* (2007). However, the turning point came when I wrote another outreach article for *Astronomía* on poetry and astronomy (Caballero, 2009). Most of the selected poems were in Spanish, but there were also a few in English, Catalanian, Latin and even kanji. The following verses were written by Al-Mu’tamid, an Andalusian-Arabian king of Seville in the 11th century:

*Luego, cuando la Luna quiso pasearse hacia Oriente,
levantó por encima de sí a Orión como un dosel,
y las estrellas avanzaron a sus lados
como batallones que alzaban a las Pléyades por bandera.*

*Next, when the Moon wished to wander towards the East,
it lifted Orion above itself like a canopy,
and the stars moved forward at its sides
like battalions that raised the Pleiades as flag.*

A couple of weeks after its publication, Antonio Arias phoned me: “Jose, I am preparing three or four songs based on the poems in your article.” Having said that Lagartija Nick is my favourite Spanish rock band, I was almost moved to tears when I heard that...

Third movement: Scherzo. Allegro

The three or four songs became a dozen and, after a few months, Antonio Arias had released *Multiverso*⁶, his first solo album. It

starts with the peculiar noises of the dome and encoders of the 2.2-metre telescope of the Calar Alto⁷ observatory, in Almería (Spain), which merge with a pulsar-like sound, a bass guitar, an electric guitar, a drum kit and, finally, Antonio Arias’s voice:

*L’ordre matemàtic simula el món real,
crea un altre món de càlcul i mental.
En el ordenador renacen las estrellas,
como hace tantos años nacieron.
Somos como creadores....*

*The mathematical order simulates the real world,
it creates other world of calculus and mind.
In the computer the stars are reborn,
like they were born so many years ago.
We are like creators....*

A set of poetry books that David Jou sent us in early 2009 were a gold mine: the lyrics of four songs in *Multiverso* are written by him. One of them is *El ordenador simula el nacimiento de las estrellas* (*The computer simulates the birth of stars*), part of which is shown above. David Jou is a professor of condensed matter physics at the Universidad Autónoma de Barcelona and also a poet with works translated into English, German, French and Russian. *Multiverso* also includes lyrics by other renowned poets, such as José Emilio Pacheco. By chance, on the day of the album premiere, it was announced that Pacheco had received the Miguel de Cervantes Prize (the Spanish equivalent of the Nobel Prize for Literature).

The last track of the album lasts over seven minutes and has no lyrics. During the preparation of the album, I had told Antonio about Johannes Kepler’s *Harmonices Mundi*, the medieval concept of *Musica*



Figure 3. Pictures taken during astro-concerts at the Teatro Isidoro Máiquez, Granada (Juano, Antonio, Julián), Sala el Sol, Madrid (Xarim, Antonio, Popi), and Universidad Complutense de Madrid (Nayra, Antonio), the most recent with an image of particle collisions at the Large Hadron Collider in the background. Credits: M. Calle (www.indy-rock.es) and Ávatar (laletracapital.blogspot.com).

Universalis, the Music of the Spheres, and its 20th century musical readout that is flying beyond the Solar System with the Voyager spacecraft. To satisfy me, Antonio prepared *Harmonia Mundi 2009*, the first music of the spheres to include only eight planets (i.e. without Pluto).

Fourth movement: Allegro

After the release of *Multiverso* and our participation in the closing ceremony of the Spanish IYA2009, I made a short appearance at the beginning of one of Antonio's rock concerts at a club in Madrid: can you imagine the faces of the public when they saw a science freak telling them that MUSE is not only a famous rock band⁸, but also the Multi-Unit Spectroscopic Explorer⁹ at ESO's Very Large Telescope?

Next, we tried to obtain a grant from the Spanish Ministry of Science to take our astro-rock show on tour through Spain, but did not succeed. However, somebody read our funding proposal and we were invited to perform our show during the meetings of the professional and amateur Spanish Astronomical Societies in Madrid in September 2010, where our honourable curtain-raiser was Carlos S. Frenk, the director of the Institute for Computational Cosmology at the University of Durham.

As I write these lines, Antonio and I are preparing a new astro-rock show to be held at CosmoCaixa¹⁰ Barcelona on Europe's Museum Day. We are preparing newer and better videos, images and songs, including one devoted to CARMENES^{11,12}, a German-Spanish high-resolution two-channel spectrograph that will perhaps detect the first habitable exo-Earth. More information on

the project can be found at <http://exoterrae.eu/usc/> (the outreach project now receives the name "unitedsoundsofcosmos").

Acknowledgements

Of course, the Rock'n'Astronomy project would not have come to pass without the most important person, the music composer, vocalist, guitar and bass player: Antonio Arias. But the two of us want to respectfully remember a very special person and artist who recently left behind millions of flamenco orphans: *maestro* Enrique Morente.

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Further Reading

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Notes

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- ² http://astronomia2009.es/Sobre_el_AIA-IYA2009/Ceremonias_AIA-IYA2009/Acto_de_Despedida_del_AIA-IYA2009.html
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- ⁷ <http://www.caha.es>
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- ⁹ <http://muse.univ-lyon1.fr/>
- ¹⁰ http://obrasocial.lacaixa.es/nuestroscentros/cosmoCaixaBarcelona/cosmoCaixaBarcelona_es.html
- ¹¹ <http://carmenes.caha.es/>
- ¹² <http://exoterrae.eu/usc/>

Biography

José A. Caballero is a young Spanish astrophysicist whose interest in astronomy began when he first saw Star Wars: A New Hope at the age of only four. Now, he is a Ramón y Cajal fellow at the Centro de Astrobiología, the co-project manager of CARMENES and an expert of the σ Orionis region, close to the Horsehead Nebula.