

# Music and Astronomy

José A. Caballero, Sara González Sánchez, Iván Caballero

**Abstract** What do Brian May (the Queen’s lead guitarist), William Herschel and the Jupiter Symphony have in common? And a white dwarf, a piano and Lagartija Nick? At first glance, there is no connection between them, nor between Music and Astronomy. However, there are many revealing examples of musical Astronomy and astronomical Music. This four-page proceeding describes the *sonorous* poster that we showed during the VIII Scientific Meeting of the Spanish Astronomical Society.

## 1 *La Música y la Astronomía*

Music and Astronomy, together with Arithmetic and Geometry, were the four subjects of the *quadrivium* taught in Scholastic medieval universities: “Music is the Continuous In Motion, Astronomy is the Discrete In Motion”. In Greek mythology, two of the nine Muses were Euterpe, the goddess of Music and lyric poetry, and Urania, the goddess of Astronomy. The ibis-headed Egyptian deity Thoth, the Pacifier of the Gods, was the god of the Music and Astronomy, apart from the Moon, Geometry, Medicine, drawing, writing... However, there is no apparent link between Music and Astronomy.

The separation between Music and Astronomy is only superficial, as already noticed by Pythagoras in his *Musica Universalis*. Sometimes, we (the astronomers) use Music for “visualising” some astrophysical mechanisms, such as pulsations of white dwarfs and red giants, magnetic fields and stellar winds of massive stars or energetic phenomena in outer atmospheres of the Solar System planets. Caballero (2007) gave numerous examples of musical Astronomy and astronomical Music (Fig. 1). A sequel, *La Música y la Astronomía 2*, is in preparation.

---

José A. Caballero  
Departamento de Astrofísica y Ciencias de la Atmósfera, Facultad de Física, Universidad Complutense de Madrid, E-28040 Madrid, Spain, e-mail: caballero@astrax.fis.ucm.es

**Fig. 1** Cover page of volume 95 of *Astronomía*, an international journal on popular Astronomy in Spanish. There, Caballero (2007) gave numerous examples of musical Astronomy and astronomical Music: Sir F. W. Herschel, who discovered Uranus and the infrared radiation after having composed 24 symphonies and many concertos; B. H. May, who became famous with Queen after having worked as an astronomer at the Observatorio del Teide; lyrics of many themes, such as *Would you like to look through my telescope?* / *The Milky Way's a fine sight to see.* / *All around the Universe, we try so hard to view / what's new* (Saved by a bell, Discovery, Mike Oldfield); CD covers with clear astronomical influence (e.g. PSR B1919+20 in Joy Division's *Unknown pleasures* or Engraved Hourglass Nebula in Pearl Jam's *Binaural*); etc.



## 2 “Astromusic”

We prepared a poster (Fig. 2) and a music compact disc (CD) to be heard *only* during the coffee breaks of the VIII Scientific Meeting of the Spanish Astronomical Society (Sociedad Española de Astronomía) held in Santander, 7–11 July 2008. The contribution fitted the section “Teaching, dissemination and popularisation of Astronomy” (“Enseñanza, difusión y divulgación de la Astronomía”).

The CD consisted of 20 tracks, splitted into one prelude (track #1), three interludes (tracks #6, #11 and #16) and four groups of musical themes and excerpts separated by the interludes. These groups were classical music (tracks #2–5), electronica and new age (tracks #7–9), international pop-rock (tracks #10 and #12–15), and Spanish music (including jazz, pop and rock; tracks #17–20). The last track also worked as the postlude of the CD. The 20 tracks are described next:

- #1 **Prelude** (Spiegel, Rogers & Ruff). The Music of the Spheres (*Musica Universalis*), a 20th-century musical readout of J. Kepler’s *Harmonices Mundi*. Each frequency represented a planet, from Mercury to Jupiter.

- #2 **Allegro / Brandenburg Concerto No. 2 in F major, BWV 1047** (J. S. Bach). The first musical piece in *Murmurs of Earth: The Voyager Interstellar Record*.
- #3 **Mars, the Bringer of War / The Planets Op. 32** (G. T. Holst). A seven-movement orchestral suite with an astrological (non-astronomical) concept.
- #4 **Molto allegro / Symphony No. 41 in C major (K. 551), Jupiter** (W. A. Mozart). The last movement of his last *sinfonia*, with a remarkable five-voice *fugato*.
- #5 **On the Beautiful Blue Danube** (J. Strauss II). The Pan Am space clipper and the Space Station 5 dance a waltz in Stanley Kubrick's film *2001: A Space Odyssey*.
- #6 **First interlude** (Gurnett et al.). Plasma oscillations when the Voyager 1 interplanetary spacecraft approached the solar wind termination shock.
- #7 **Movement 3 / Heaven and Hell (Theme from Cosmos)** (Vangelis). Main theme of the television documentary series *Cosmos*. Listen also Albedo 0.39, Pulsar...
- #8 **Fourth Rendez-Vous / Rendez-Vous** (J. M. Jarre). The last piece of the album was dedicated to the seven astronauts that died in the *Challenger* disaster.
- #9 **Radio Sterne / Radio-Aktivität** (Kraftwerk). Did video kill the radio stars? *Aus des Weltalls Ferne / Funken Radiosterne / Pulsare und Quasare*.
- #10 **Space Oddity / Space Oddity** (D. Bowie). Released to coincide with the first moon landing, the song tells the story of the astronaut Major Tom.
- #11 **Second interlude** (ESA). Radar echoes from Titan's surface: as the Huygens probe approaches the ground, both the pitch and intensity increase.
- #12 **Across the Universe / Let it be** (The Beatles). The song was emitted in 2008 towards the star Polaris by the NASA 70 m antenna in Robledo de Chavela.
- #13 **The Miracle / The Miracle** (Queen). In May 2008, Brian May got his Ph.D. degree with the thesis *A Survey of Radial Velocities in the Zodiacal Dust Cloud*. We wait for you at the *Concierto de las Estrellas* at the Gran Telescopio Canarias!
- #14 **Emily / Ys** (Joanna Newsom). Emily is an astrophysicist, apart from Joanna's sister. They explain us what the meteorite, meteor and meteoroids are.
- #15 **Arc of a journey / Tender Buttons** (Broadcast). *Constellation of Orion / A picture with a past / A future so vast*. Retro-futuristic sci-fi sounds.
- #16 **Third interlude** (Lagartija Nick). A theremin at the beginning of *Cosmos*, in El shock de Leia. Look also for the SETI 1st Theremin Concert for Aliens.
- #17 **Llamando a la Tierra / Usar y tirar** (M-Clan). *He visto una luz / Hace tiempo Venus se apagó / He visto morir / una estrella en el cielo de Orión*.
- #18 **Toxicosmos / Una semana en el motor de un autobús** (Los Planetas). Their last album is *La leyenda del espacio*, a tribute to Camarón's *La leyenda del tiempo*.
- #19 **L'Univers / L'Univers** (12twelve). A Barcelonese band with mixes of free-jazz, post-rock and "Ciencia para todos los públicos" (popular science).
- #20 **Azora 67 / Lagartija Nick** (Lagartija Nick). A song to fight the light pollution! *Demasiada luz / Demasiada luz / Mi cielo está vacío con demasiada luz*.

**Acknowledgements** JAC thanks Antonio Arias and countless members of the the Sociedad Española de Astronomía for their back up and feed back. Partial financial support was provided by the Spanish Ministerio Educación y Ciencia, the Comunidad Autónoma de Madrid, the Universidad Complutense de Madrid and the European Social Fund.



Fig. 2 Poster presented by the authors in the VIII Scientific Meeting of the Spanish Astronomical Society. A CD player with headphones and speakers was available in front of the poster, and astronomers could choose any track for listening.

## References

1. J. A. Caballero, *Astronomía* **95**, 26 (2007).