“De Mayrit al cielo”: a mass function from 20 to 0.003 M_{sol} in σ Orionis

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Abstract. The star σ Orionis A (O9.5V) is visible with the naked eye, illuminates the mane of the Horsehead Nebula and, with about 18 M_{sol}, it is the most massive one in the homonymous cluster. S Ori 70 (T6) is, with about 0.003 M_{sol}, the least massive isolated body yet found out of the Solar System. Covering the whole mass interval in between, the σ Orionis cluster has Herbig Ae/Be and T Tauri stars, proplyds, X-ray emitters, Herbig-Haro jets, variable brown dwarfs, “isolated planets”... The *Mayrit* catalogue is the result of a continuous effort to study in deep one of the most important star-forming regions.

Mayrit 497054: this red, Hα-emitter, disc-host , variable star was discovered by Haro as soon as in 1953 (*Caballero 2008, A&A, 478, 667*)

Mayrit 528005 AB+ Mayrit 530005: a triple system consisting of a close double K7Ve and a wide companion at the substellar boundary (*Caballero 2005, AN, 326, 1007*)

Mayrit 344377: this X-ray star has a rotational velocity of 70 km/s and had to be discarded from an abundance analysis (González Hernández, *Caballero et al. 2008, A&A, 490, 1135*)

Mayrit AB (σ Ori AB): it is a3 Ma-old *triple* hyerarchical system of O9.5V, B0V and B0.5V stars at about 385 pc. It injects most of the intracluster energy and is, besides, the most massive *binary* with an astrometric orbit (*Caballero 2008, MNRAS, 383, 750*)

2MASS J05382931-0233128: an extended galaxy clearly resolved in the Digital Sky Survey. There are other examples of galaxies with strong X-ray emission (*López-Santiago & Caballero 2008, A&A, 491, 961*)

[BZR99] S Ori 60: out of the field of view, it is the least massive object with an uncontrovertible circumsubstellar disc. It awaits its Mayrit designation (Zapatero Osorio, *Caballero et al. 2007, A&A, 472, L9*)

IRAS 05358-0238: this bright red star is a background giant, just as many other pulsating ones found in the Orion Belt (*Caballero et al. 2010, AN, 331, 257*)

Mayrit 42062 AB (σ Ori E): this helium-rich B2Vp star has a close companion that originates the flares observed in X-rays (*Caballero et al. 2009, AJ, 137, 5012*)

Mayrit 306125 AB: this B5V star, which is a close binary, is one of the brightest stars of the σ Orionis cluster (*Caballero 2007, A&A, 466, 917*)

Mayrit 92149 AB: with an angular separation of 1.9 arcsec, it was the first “wide” low-mass binary found in the cluster (*Caballero 2007, 328, 917*)

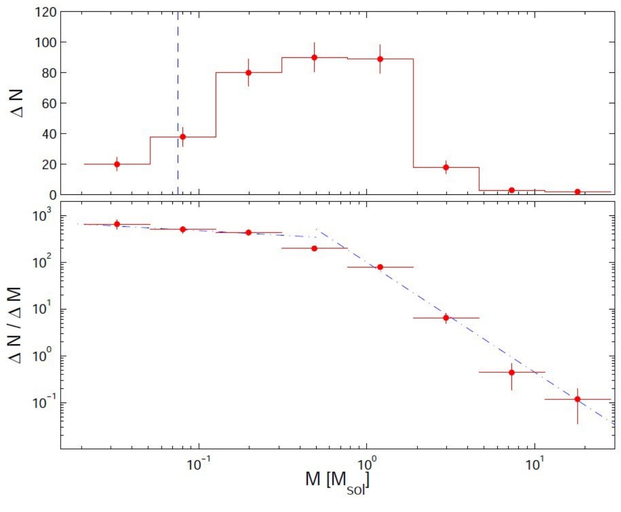
UCM 0536-0239: previously thought to be Class I object, it is actually a Type I obscured QSO at z = 0,2362 0,0005 (*Caballero et al. 2008, A&A, 491, 515*)

Mayrit 495216: the most variable brown dwarf in the sky. It accretes from a disc and has blue veiling and forbidden lines in emission (*Caballero et al. 2006, A&A, 445, 143*)

Mayrit 433123: a periodic variable brown dwarf tidally locked to an imperceptible disc inclined about 46 deg (*Caballero et al. 2004, A&A, 491, 515*)

Mayrit 358154: an intermediate-mass brown dwarf with a disc found with a very deep WFC+ VLT + *Spitzer* survey (*Caballero et al. 2007, A&A, 470, 903*)

2MASS J05385543-0241297: also previously thought to be a cluster member, it is a foreground dwarf with a proper motion larger than 100 mas/a (*Caballero 2010, A&A, 514, A18*)



Mayrit [*máj-rit*]. It means *“source of water”* in old Arabic. *Mayrit* → *Magerit* → *Madrid*. The three last digits indicate the orientation with respect to the cluster centre (θ), in degrees, and the first digits the angular separation (ρ), in arcsec.
The picture. False-colour image of the inner region of the σ Orionis cluster. Red, green and blue are for 8.0 μm IRAC/*Spitzer*, *J* 2MASS and far-UV/soft-X-rays *ROSAT*, respectively. Stars with discs appear reddish, while X-ray active stars appear blueish. There are also red galaxies.
The IMF. To the left, the mass spectrum of the σ Orionis cluster from 18 to 0.04 M_{sol}. The de-contamination and extension towards the lowest masses possible (down to 0.001 M_{sol}?) are the objective of recent and underway works (e.g. Bihain et al. 2009; Peña et al., in prep.).