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J/A+A/589/A70 Gamma Vel cluster membership and IMF (Prisinzano+, 2016)

The Gaia-ESO Survey:

membership and Initial Mass Function of the Gamma Velorum cluster.

Prisinzano L., Damiani F., Micela G., Jeffries R.D., Franciosini E., Sacco G.G., Frasca A., Klutsch A., Lanzafame A., Alfaro E.J., Biazzo K., Bonito R., Bragaglia A., Caramazza M., Vallenari A., Carraro G., Costado M.T., Flaccomio E., Jofre P., Lardo C., Monaco L., Morbidelli L., Mowlavi N., Pancino E., Randich S., Zaggia S.

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=[2016A&A...589A..70P](#) (SIMBAD/NED BibCode)

ADC_Keywords: Clusters, open - Stars, pre-main sequence - Stars, masses - Radial velocities - HR diagrams - Spectroscopy

Keywords: stars: pre-main sequence - open clusters and associations: individual: Gamma Velorum - stars: formation - stars: luminosity function, mass function - techniques: radial velocities - techniques: spectroscopic

Abstract:

Understanding the properties of young open clusters, such as the Initial Mass Function (IMF), star formation history and dynamic evolution, is crucial to obtain reliable theoretical predictions of the mechanisms involved in the star formation process. We want to obtain a list, as complete as possible, of confirmed members of the young open cluster Gamma Velorum, with the aim of deriving general cluster properties such as the IMF. We used all available spectroscopic membership indicators within the Gaia-ESO public archive together with literature photometry and X-ray data and, for each method, we derived the most complete list of candidate cluster members. Then, we considered photometry, gravity and radial velocities as necessary conditions to select a subsample of candidates whose membership was confirmed by using the lithium and H α lines and X-rays as youth indicators. We found 242 confirmed and 4 possible cluster members for which we derived masses using very recent stellar evolutionary models. The cluster IMF in the mass range investigated in this study shows a slope of $\alpha=2.6\pm 0.5$ for $0.5 < M/M_{\odot} < 1.3$ and $\alpha=1.1\pm 0.4$ for $0.16 < M/M_{\odot} < 0.5$ and is consistent with a standard IMF. The similarity of the IMF of the young population around gamma² Vel to that in other star forming regions and the field suggests it may have formed through very similar processes.

Description:

We derived a list as complete as possible of confirmed members of the young open cluster Gamma Velorum, with the aim of deriving general cluster properties such as the IMF. We used all available spectroscopic membership indicators within the Gaia-ESO public archive, based on spectra acquired with FLAMES at the VLT using the GIRAFFE intermediate-resolution spectrograph. In addition, we used literature photometry and X-ray data. For each membership criterion, we derived the most complete list of candidate cluster members. Then, we considered photometry, gravity, and radial velocities as necessary conditions for selecting a subsample of candidates whose membership was confirmed by using the lithium and H α lines and X-rays as youth indicators. Table 5 lists the fundamental parameters of the confirmed and possible members in Gamma Velorum, i.e. photometry, radial velocities, equivalent widths of the lithium line, the H α activity index, the X-ray flag, the gravity gamma index and the stellar masses. Finally the binarity and membership flags are given.

File Summary:

FileName	Lrecl	Records	Explanations
ReadMe	80	.	This file
table5.dat	96	246	Fundamental stellar parameters for cluster members

See also:

- [J/MNRAS/393/538](#) : Stellar association around gamma Vel (Jeffries+, 2009)
- [J/A+A/563/A94](#) : Kinematics of the Gamma Vel cluster (Jeffries+, 2014)

Byte-by-byte Description of file: [table5.dat](#)

Bytes	Format	Units	Label	Explanations
1- 16	A16	---	CName	Target Name in the Gaia-ESO archive (HHMSSss+DDMMSSs)

18- 22	F5.2	mag	Vmag	Apparent V magnitude (Johnson)
24- 27	F4.2	mag	V-Ic	V-I color index (Cousins)
29- 33	F5.2	km/s	HRV	Mean heliocentric radial velocities
35- 39	F5.2	km/s	e_HRV	rms uncertainty on HRV
41- 46	F6.2	0.1nm	EWLi	? Equivalent width of 6708Å Li line
48- 53	F6.2	0.1nm	e_EWLi	? rms uncertainty on EWLi
55- 59	F5.3	---	alphac	? alpha _c chromospheric activity index
61- 65	F5.3	---	e_alphac	? rms uncertainty on alphac
67	I1	---	fXrays	[0/1]? X-rays detection flag (1=yes)
69- 73	F5.3	---	gamma	? Gravity index gamma
75- 79	F5.3	---	e_gamma	? rms uncertainty on gamma
81- 85	F5.3	Msun	Mass	? Stellar Mass
87- 91	F5.3	Msun	e_Mass	? rms uncertainty on Mass
93	I1	---	fBin	[0/2] Binarity flag (1)
95- 96	A2	---	fMem	[CM PM] Membership flag (2)

Note (1): Binarity flag as follows:

- 0 = single star
- 1 = single-lined spectroscopic binary (SB1)
- 2 = double-lined spectroscopic binary (SB2)

Note (2): Membership flag as follows:

- CM = confirmed cluster members
 - PM = possible cluster members
-

Acknowledgements:

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References:

Jeffries et al., [2009MNRAS.393..538J](#), Cat. [J/MNRAS/393/538](#)
 The stellar association around Gamma Velorum and its relationship with Vela OB2

Jeffries et al. [2014A&A...563A..94J](#), Cat. [J/A+A/563/A94](#)
 The Gaia-ESO Survey: Kinematic structure in the Gamma Velorum cluster

(End) Loredana Prisinzano [INAF, Italy], Patricia Vannier [CDS] 20-Apr-2016

The document above follows the rules of the [Standard Description for Astronomical Catalogues](#); from this documentation it is possible to generate **f77** program to load files [into arrays](#) or [line by line](#)