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Authors	FRANCHINI, Mariagrazia, MOROSSI, Carlo, DI MARCANTONIO, Paolo, Malagnini, M. L., Chavez, M.
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J/MNRAS/442/220 Lick indices for FGK stars (Franchini+, 2014)

The FEROS-Lick/SDSS observational data base of spectral indices of FGK stars for stellar population studies.

Franchini M., Morossi C., Marcantonio P.D., Malagnini M.L., Chavez M.
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[=2014MNRAS.442..220F](#)

ADC_Keywords: Stars, late-type ; Spectroscopy ; Abundances

Keywords: astronomical data bases: miscellaneous -
stars: fundamental parameters - stars: late-type

Abstract:

We present FEROS-Lick/SDSS, an empirical data base of Lick/SDSS spectral indices of FGK stars to be used in population synthesis projects for discriminating different stellar populations within the integrated light of galaxies and globular clusters. From about 2500 FEROS stellar spectra obtained from the European Southern Observatory Science Archive Facility, we computed line-strength indices for 1085 non-supergiant stars with atmospheric parameter estimates from the AMBRE project. Two samples of 312 dwarfs and of 83 subgiants with solar chemical composition and no significant α -element abundance enhancement are used to compare their observational indices with the predictions of the Lick/SDSS library of synthetic indices. In general, the synthetic library reproduces very well the behaviour of observational indices as a function of temperature, but in the case of low-temperature ($T_{\text{eff}} \lesssim 5000\text{K}$) dwarfs; low-temperature subgiants are not numerous enough to derive any conclusion. Several possible causes of the disagreement are discussed and promising theoretical improvements are presented.

Description:

The stars observed by FEROS and studied by the AMBRE project (Worley et al., [2012A&A...542A..48W](#)) constitute an ideal working data set for our purposes since they include a large number of non-supergiant FGK stars with individual estimates of T_{eff} , $\log g$, $[M/H]$, and α -to-iron ratio ($[\alpha/\text{Fe}]$).

We searched the European Southern Observatory (ESO) Science Archive Facility and retrieved, through the FEROS/HARPS pipeline processed data Query Form, all the public available spectra of FGK stars with AMBRE atmospheric parameter values in the following ranges: $3800 < T_{\text{eff}} < 7500\text{K}$, $\log g > 3.5$, and global metallicity $[M/H] > -3.0$.

A list of 1085 stars, corresponding to 2511 available spectra, was obtained. Since AMBRE provides individual estimates of stellar parameters derived from each spectrum, we computed for 202 stars with more than one observed spectrum average atmospheric parameter values. In any case, the dispersion of values for the same object resulted to be less than the external errors associated with AMBRE results.

File Summary:

FileName	Lrecl	Records	Explanations
ReadMe	80	.	This file
table1.dat	309	1085	Table of observational Lick/SDSS indices of 1085 FGK FEROS stars

Byte-by-byte Description of file: [table1.dat](#)

Bytes	Format	Units	Label	Explanations
1- 23	A23	---	Name	Star name
25- 26	I2	---	Nsp	[1/97] Number of spectra (1)
28- 31	I4	K	Teff	[3830/7420] Effective temperature
33- 35	I3	K	e_Teff	[0/110] rms uncertainty on Teff
37- 40	F4.2	[cm/s ²]	logg	[3.5/5] Surface gravity
42- 45	F4.2	[cm/s ²]	e_logg	[0/0.18] rms uncertainty on logg
47- 51	F5.2	[Sun]	[M/H]	[-2.5/0.8] Metallicity
53- 56	F4.2	[Sun]	e_[M/H]	[0/0.1] rms uncertainty on [M/H]
58- 62	F5.2	[Sun]	[a/Fe]	[-0.4/0.5]?=- [alpha/Fe] abundance
64- 67	F4.2	[Sun]	e_[a/Fe]	[0/0.1]?=- rms uncertainty on [alpha/Fe]
69- 74	F6.3	0.1nm	CaHK	?=- Lick Ca H&K index
76- 80	F5.3	0.1nm	e_CaHK	?=- rms uncertainty on CaHK
82- 86	F5.3	mag	CN1	?=- Lick CN ₁ index
88- 92	F5.3	mag	e_CN1	?=- rms uncertainty on CN1
94- 98	F5.3	mag	CN2	?=- Lick CN ₂ index
100-104	F5.3	mag	e_CN2	?=- rms uncertainty on CN2
106-110	F5.3	0.1nm	Ca4227	?=- Lick Ca4227 index
112-116	F5.3	0.1nm	e_Ca4227	?=- rms uncertainty on Ca4227

