CSI:

COOL SUBDWARFS INVESITGATION™

Subdwarfs Multiplicity Studies
Wei-Chun Jao
Georgia State University

Motivation

CS:Multiplicity

Motivation

CSI:Mass

Multiplicity

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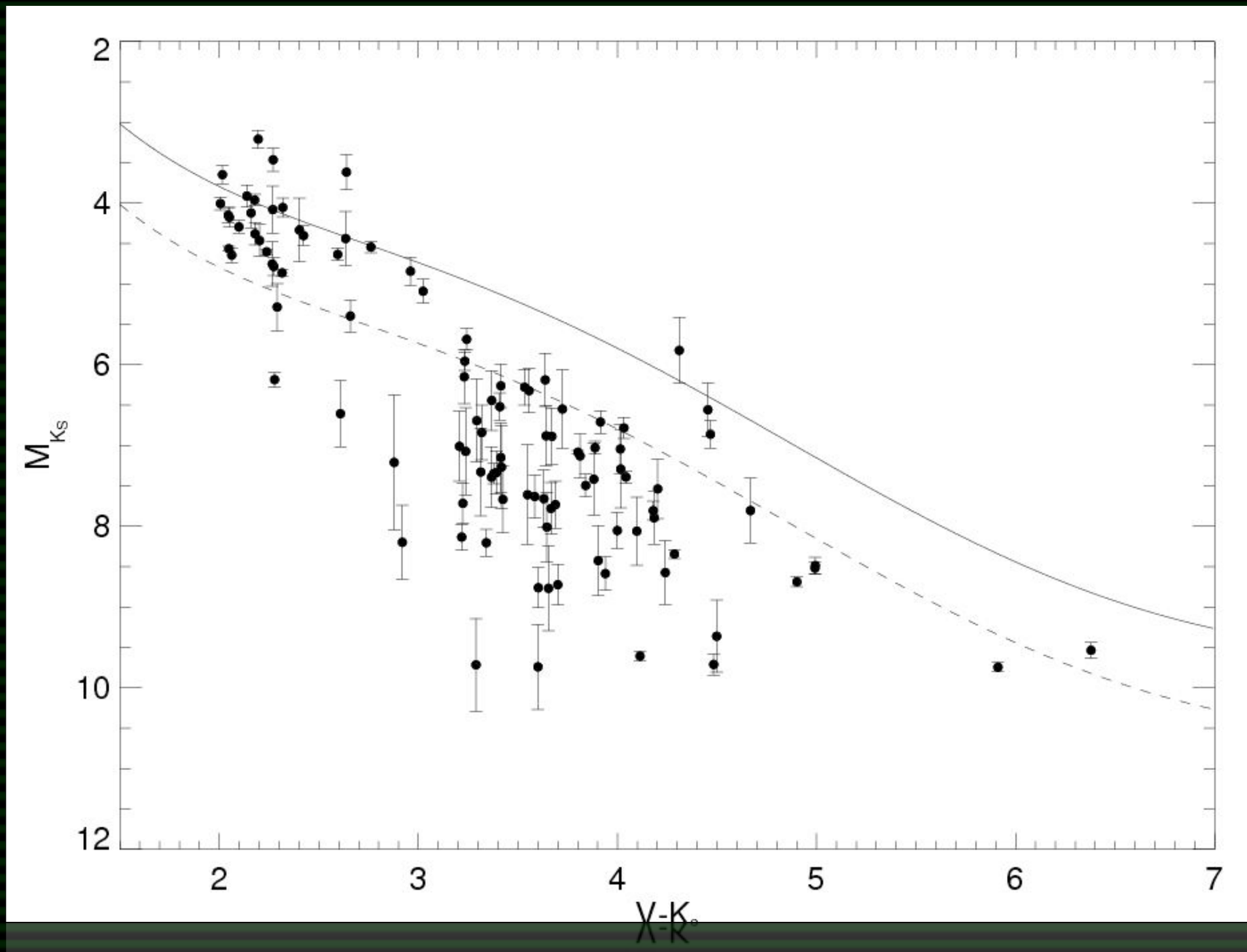
Cool subdwafs

CS:Multiplicity

Cool subdwafs

- They have lower metallicity or higher gravity than dwarfs.
- They have stronger CaH and TiO bands than dwarfs.
- They are usually below the main sequence and have kinematic (i.e. tangential velocity) different from dwarfs.

60 pc K and M Subdwafs



Where are cool subdwarfs?

CST:Multiplicity

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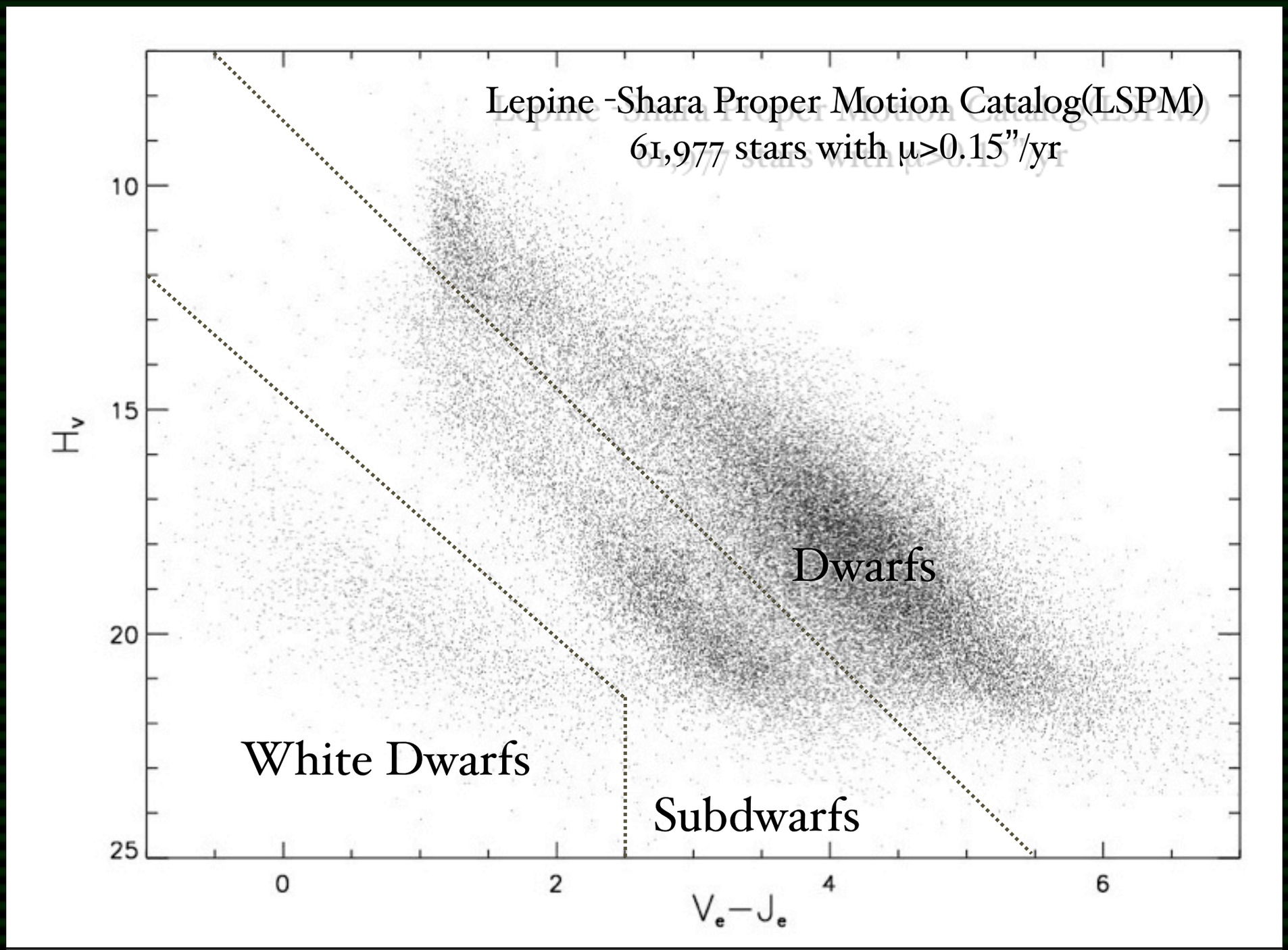

Main Sequence Stars Multiplicity

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Main Sequence Stars Multiplicity

Mason et al. (1998)

more than 59% of O-type stars in clusters and associations have a visual, speckle or spectroscopic companion.

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Dwarf	>59%		
Subdwarf			

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Duquennoy & Mayor (1991)

57% of solar type binaries have mass-ratio greater than 0.1 after considering their survey incompleteness

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Henry & McCarthy (1990), Fischer & Marcy (1992)
M dwarf multiplicity is between 34% and 42%

Based on RECONS's 10pc sample

K dwarfs : 15/30 (20%+)*
M dwarfs : 42/170 (24%+)*

* not all of them have been searched for companions.

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Subdwarfs Multiplicity

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  spectroscopic confirmed subdwarfs

  0 / 9 systems (0%)

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- Gizis et al (2007, in preparation): HST/ACS

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  0/19 (0%)

Optical Speckle Results

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B. Mason & B. Hartkopf's CCD Optical Speckle runs @ KPNO
and CTIO in 2006

various catalogs, including Ryan and Norris Sample (1991)
Carney-Latham Sample (1992)
Gizis(1997), Taylor et al (2003), Jao et al (2007)

We observed 95 systems (8 wide binaries and 2 SB2)
All are within 60pc.

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We observed 95 systems (8 wide binaries and 2 SB2)
All are within 60pc.

Results:
2 new system(0.6″ and 0.15″), and
confirm 2 other known components (3.1″ and 0.13″)

12/95 system (13%)

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However, Latham et al (2002) showed 15% : 16% binary fraction for halo and disk populations among their sample.

If so, K and M type subdwarfs should have components as many as 40%!

What could happen?

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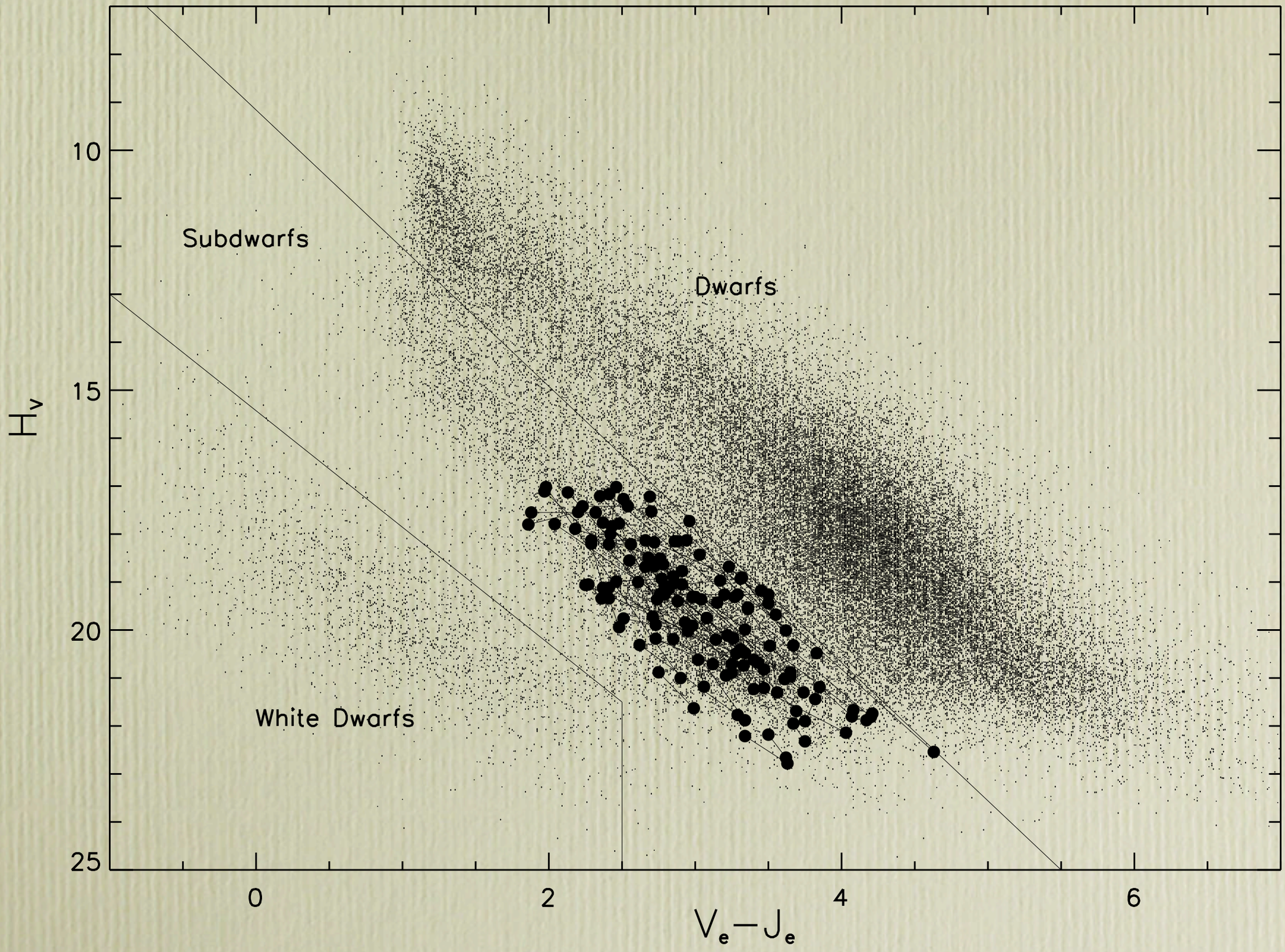
Wide Common Proper Motion Stars (<10′) from LSPM catalog



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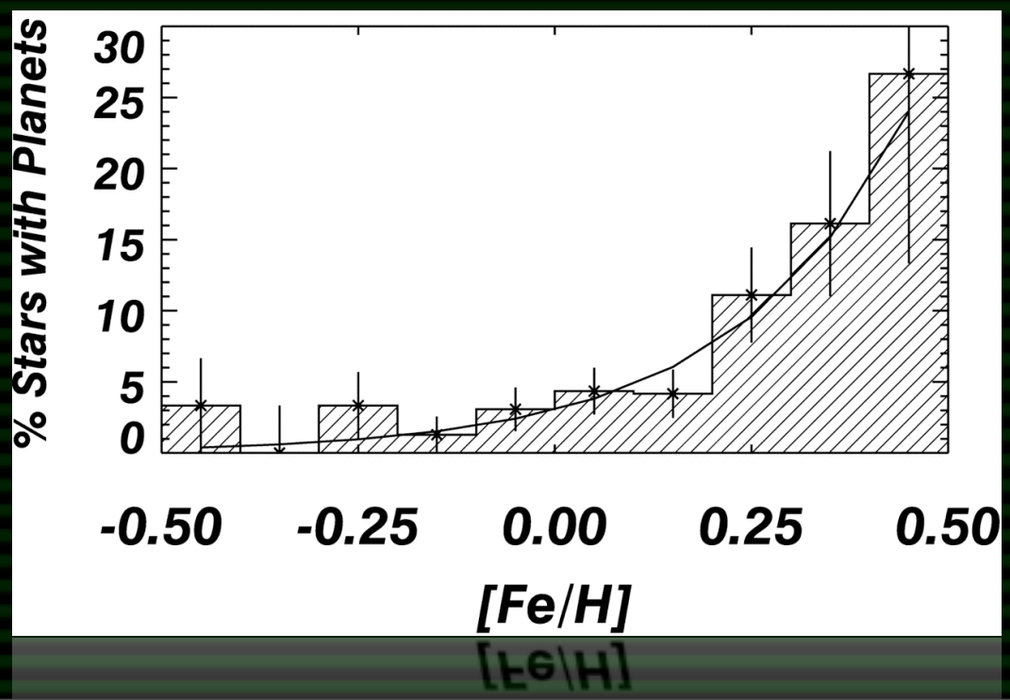

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Of course, more future work and
your comments are necessary !