Lab Course

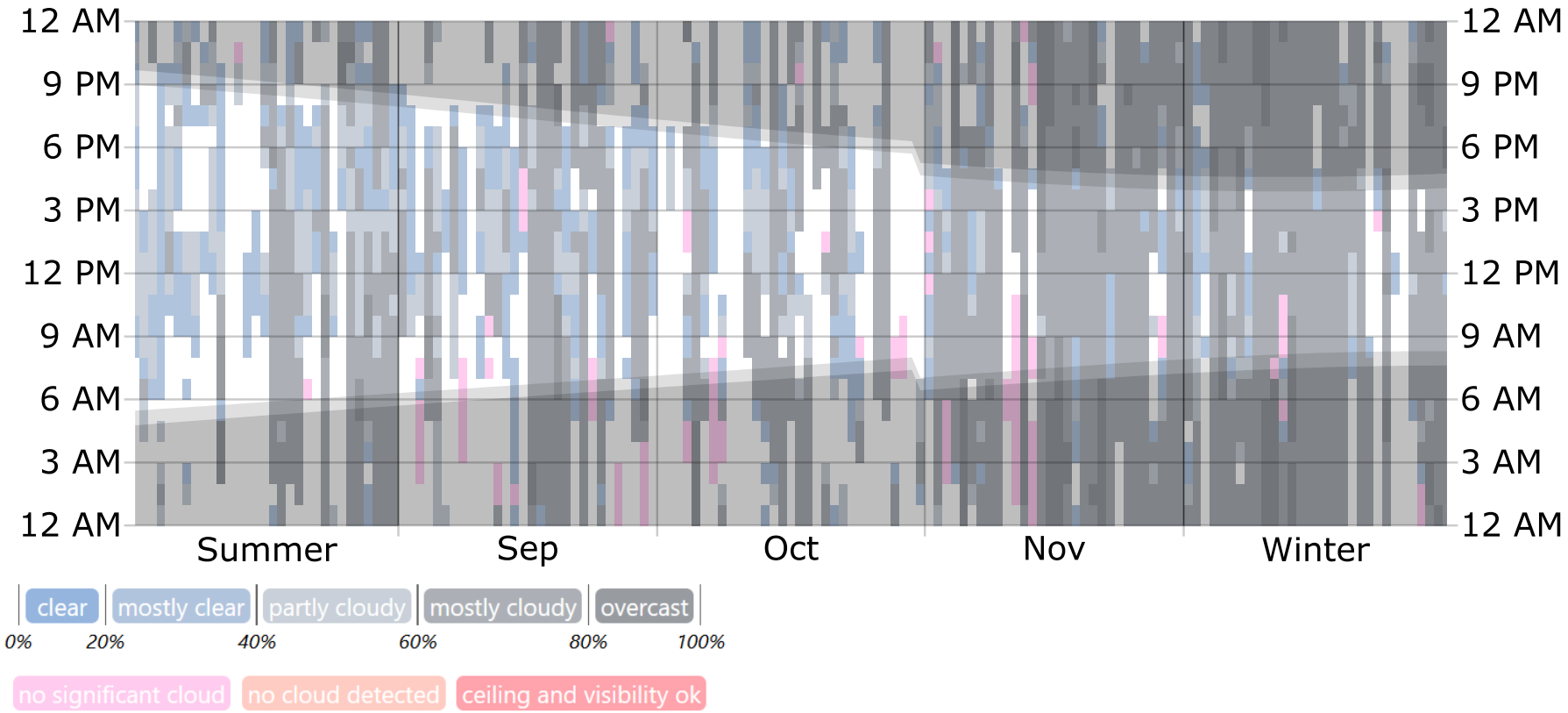
# Mid-term Roundup

**4th January 2022**

# Happy New Year!!!


Figure: JWST has finally launched!

# Plan on Observations - A Look Back in Time




https://weatherspark.com/h/m/75940/2021/12/Historical-Weather-in-December-2021-in-Potsdam-Germany#Figures-CloudCover

Figure: Potsdam hourly cloud coverage

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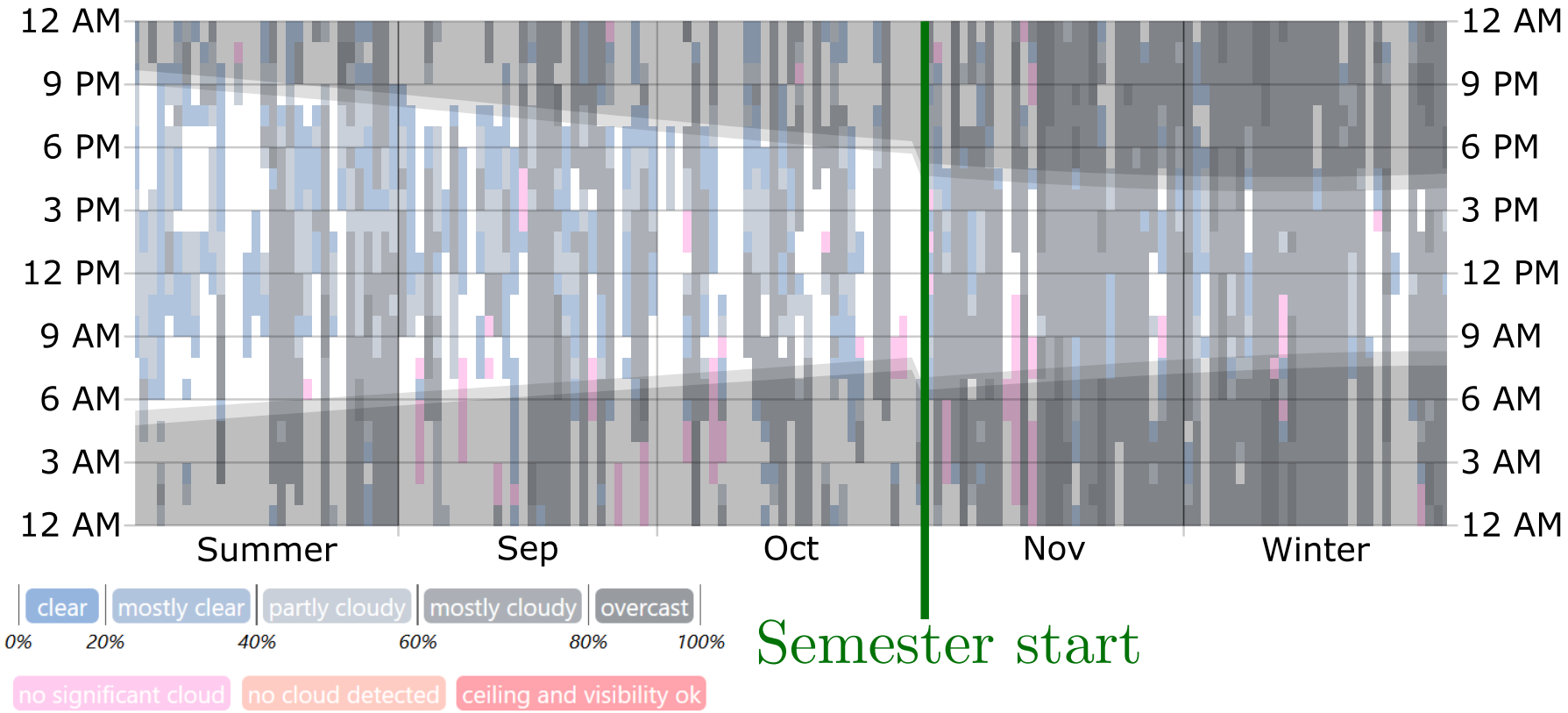


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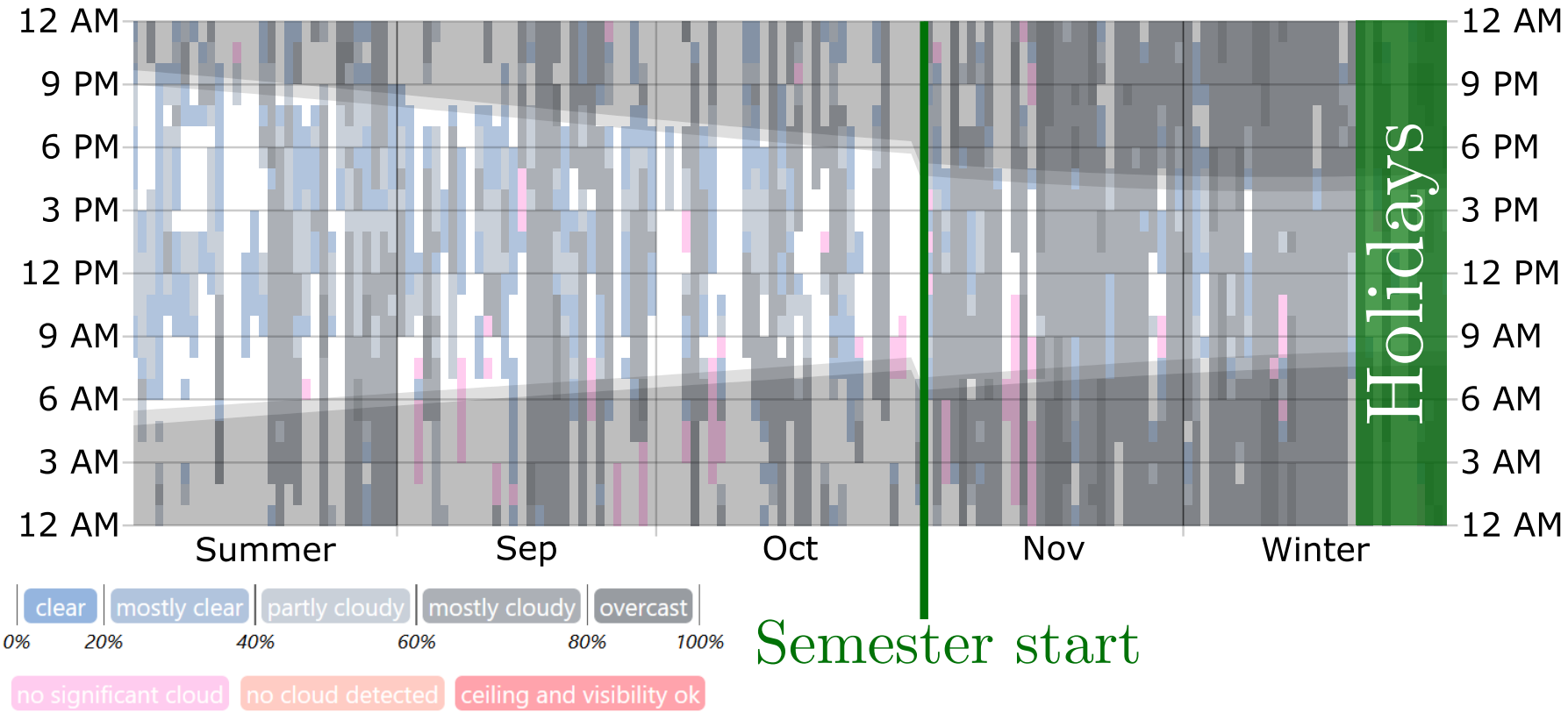


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# How to Proceed

## The Optimist's Option

- Proceed as used to and hope for good weather
- **If** there are no Observations possible till **15th Feb. 2022**

$\overset{*}{\Longrightarrow}$ Archival data will be given to you

IMPORTANT: **All** reports must be submitted before **7th Mar. 2022**

*If you have not observed by the 15th Feb and you get data, you only have 3 weeks for both reports*

$\Longrightarrow$ Crunch time!

## The Pessimist's/Impatient's Option

- Write a mail to **prakt@astro.physik.uni-potsdam.de** requesting archival data

$\Longrightarrow$ the same procedure follows as previously discussed in $*$

# How to Proceed

**Feel free to reach out whenever you feel uncomfortable to wait longer for an observational window!**

[ But not later than the **15th Feb** ]

# What if you cannot perform “real observations”?

1. Reach out via mail with the request for archival data
2. Agree on some convenient time for “mock observations”
   1. Get to know the observatory setup (telescope, cameras, spectrograph, ...).
   2. Have a little discussion/quiz about the general observation principles.
   3. Receive archival data.
3. Proceed with the data reduction + report writing as usual

# Submission of N2 observation plans

Regardless of what option you choose:

- Submit an observation plan for N2 (photometry on *open* star clusters) including **3** favorable targets for January/early-February nights.
- Particularly pay attention to criteria given at the Wiki page!
  - sufficiently large/small cluster size
  - small brightness scattering of cluster members

This has to be done by **all** Groups by **31st Jan. 2022.**

$\rightarrow$ feel encouraged to hand it in earlier

# Recap

## Important Dates

31st Jan. 2022 deadline for the N2 observation plans (submission via Email)

15th Feb. 2022 deadline for observation booking

7th Mar. 2022 deadline for handing in the reports

Choose between the optimist's and pessimist's option at any time (but before the 15th Feb!).

# Useful Links

## Find a suitable cluster candidate

- Pan across the sky ($\rightarrow$ in which areas of the sky can they be usually found?) and look for some promising candidates.
- More specifically, account for:
  - high altitudes at observation time
  - moderate sizes ($\sim$ FOV of the setup)
  - low brightness scattering
- Stellarium can be a convenient tool for checking the visibility. It is accessible as
  - the web version
  - the downloadable and executable
- the latter one allows to overlay (after some configuration) the telescope's FOV directly on the sky

$\Longrightarrow$ **Convenient!**

# Useful Links

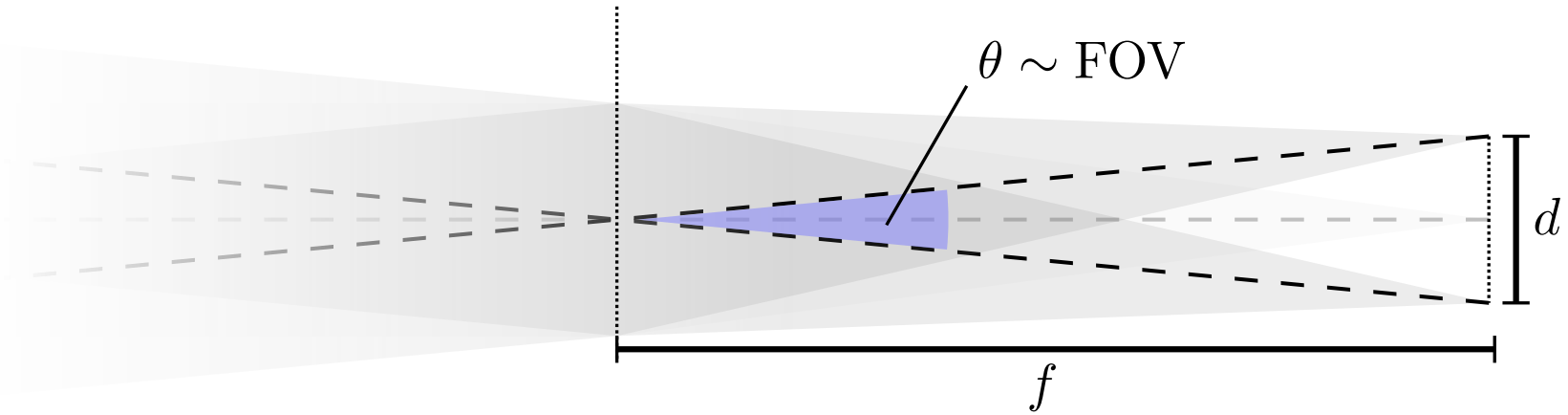
## Determine the apparent size of an arbitrary *open* star cluster

- All clusters should be listed in some catalog and their properties easily accessible on the internet

  $\Longrightarrow$ you can easily "SIMBAD" them

## Determine the FOV of the telescope + Camera

- need for focal length $f$ and chip diameter $d$ $\Longrightarrow$ OST Wiki
  - calculation, utilizing basic trigonometric math relations
  - Do this by yourself as a mini-exercise to determine the FOV :))



# Proper Isochrone Data Formatting (N2)

- for N2, you will have to plot isochrones on top of your CMD scatter plot
- different websites/webservices will provide different ascii file formatting
- a nice tool to retrieve isochrone data is the "SYCLIST", provided by the University of Geneva:
  https://www.unige.ch/sciences/astro/evolution/en/database/syclist/

  $\Longrightarrow$ you will need to adjust the formatting accordingly

  $\Longrightarrow$ if problems occur, the python routine won't plot **any** isochrones

# Proper Isochrone Data Formatting (N2)

- The `plot_cmd.py` assumes a certain formatting.
- The lower figure should illustrate how the data should be arranged to be successfully read by the routine.

## File Arrangement

- one directory e.g. `all_isochrones/` that contains all the isochrone data
- in this directory, each ASCII-data file corresponds to an isochrone
- it is useful to find systematic and reasonable file name patterns (the specific file names do not really matter)
- such a directory might contain files like
  - `iso_0_5gyr.dat`
  - `iso_1gyr.dat`
  - `iso_2gyr.dat`
  - `iso_3gyr.dat`

# Proper Isochrone Data Formatting (N2)

## Data Formatting

The data contained by the respective file should satisfy the following conditions:

- At least two columns, thereof a "V" and "B-V" column, respectively.
- A column header (one line) is optional, but may improve the file's readability.
- each column is separated by **one white-space** (no commas, tabs, etc.)

```
B-V V
0.247 1.0
0.662 1.075
0.886 1.148
1.076 1.216
1.244 1.278
  :     :
  :     :
```

Figure: An example file, illustrating the proper ASCII data formatting

# Some screenshots

**Basic data :**

**Cl Melotte 22** -- Open (galactic) Cluster

| | |
|---|---|
| Other object types: | OpC (2013A&A,OCl), Cl* (C,Cl,...), As* (2019AJ,[KC2019]), X (H) |
| **ICRS** coord. *(ep=J2000) :* | 03 46 24.2 +24 06 50 (Optical) [ ] D 2020A&A...633A..99C |
| **FK4** coord. *(ep=B1950 eq=1950) :* | 03 43 25.7 +23 57 36 [ ] |
| **Gal** coord. *(ep=J2000) :* | 166.4628 -23.6146 [ ] |
| Proper motions *mas/yr* : | 19.997 -45.548 [0.127 0.101 90] B 2018A&A...616A..10G |
| Radial velocity / Redshift / cz : | V(km/s) 6.57 [0.17] / z(spectroscopic) 0.000022 [0.000001] / cz 6.57 [0.17] (NIR) A 2019A&A...623A..80C |
| Parallaxes *(mas)*: | 7.364 [0.005] B 2018A&A...616A..10G |
| Angular size *(arcmin)*: | 1200 1200 90 (Opt) D 2009PASP..121..450B |

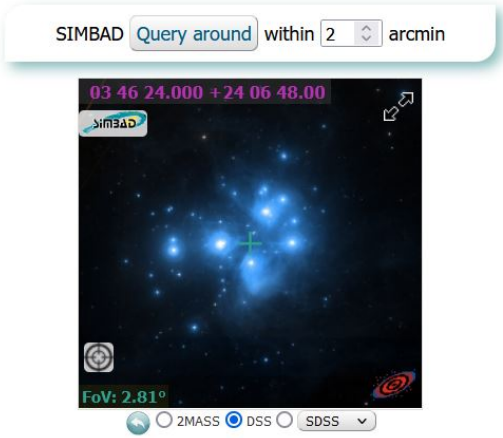



Figure: SIMBAD query of an open cluster (e.g. M45)

# Some screenshots


Figure: Screenshot of Stellarium with the FOV-overlay

# If there are remaining Questions ...

**... do not hesitate to**

**reach out to us via**

**prakt@astro.physik.uni-potsdam.de**