NOTES for Outreach Telescope Tours

Laura Rossetto – February 14th 2018

I start the talk in the hall of the cupola by presenting myself shortly. I then usually follow the topics on the poster hanged on the wall (**outreach_poster_final.pdf**). The topics are summarized in the following.

1 – I start talking about the electromagnetic spectrum, telling what frequencies we can observe from Earth and why, and for what frequencies we need to observe outside the atmosphere. I also tell people why the Netherlands is very advanced in Radio Astronomy (for someone this is not trivial at all).

2 – I describe the entire electromagnetic spectrum and show how our Galaxy looks like at different frequencies/wavelengths/energies.

3 – I then explain a bit about our closest star, the Sun. This is because most of the time the tours are given during the day, and by using the 20-cm telescope we can observe the sun spots. So I explain what the sun spots are, by using information on the poster, and also a picture hanged on the wall of 20-cm cupola.

4 – I describe what telescopes are located in the Netherlands. If it does not rain, I go outside on the terrace and show people the 2 radio telescopes we have, and the prototype of one LOFAR Low Band Antenna. Since my main research topics is cosmic rays, I also briefly introduce this topic and show them the ski-box we have on the terrace which contains a scintillator detector. This was part of a big high-school project: many boxes were put on the roof of high-schools across the Netherlands for detecting Extensive Air Showers (sometimes in the crowd there are students who participated in this project). If there is time, and if they want, I also take a picture of the group with the two cupolas on the back.

I then first enter the cupola of the **20-cm telescope**. I tell a bit about this telescope. People are usually very interested in the history behind it.
Briefly: this is a 100-years old telescope which was built by a French guy in 1905, it was then bought by a Dutch monk who was very interested in astronomy, and he managed to bring it to Nijmegen in 1965. The original lenses have been replaced in 1932, and the mount has been replaced around 2012/13. For more technical information you can read this page on the wiki https://astro.ru.nl/wiki/telescopes .
I usually explain that this is a Galilean-type telescope (refractor) and that it has an equatorial mount (only 1 rotation axis inclined at 51 degrees, i.e. the latitude of Nijmegen). You find some sketch on how this type of telescope works on the wall of the cupola (also on page 4 of the file **outreach_material_v1.0.pdf**). I also tell them that this is a commercial mount, also used in amateur telescopes because it is very easy to use.
I then tell that this telescope is mainly used for outreach purposes, not for the state-of-the-art Astronomy (people are usually very surprised about that!).

If the tour is given during the day and it does not rain, I usually prepare the set-up in order to observe the sun spots. NOTE: you need to have everything already prepared.

I then bring the group to the **35-cm telescope**, and explain them the differences between this telescope and the 20-cm one. This is a Schmidt-Cassegrain telescope, and also in this case I use the sketch of the telescope to explain how it works and why this is better for astronomical observations.

If it rains or the tour is during the day, you can show some pictures taken with this telescope and the CCD camera. These pictures are stored on the computer. I report here the list of these objects. Together with the image, I usually say few words (what the object is, how far away from us the object is, etc.). People are usually very impressed by these images:

→ M27 – Dumbel Nebula (discovered by Messier in 1764, first planetary nebula ever discovered, distance is approx. 1000 ly)

→ M42 – Orion Nebula (in Orion constellation, distance = 1300 ly)

→ M51 – Whirlpool Nebula (binary galaxy, distance = 23 Mly)

→ M57 – Ring Nebula (planetary nebula discovered in 1770, distance = 2000 ly)

→ M82 – Starbust Galaxy (young galaxy, distance = 11 Mly)

→ M101 – Pinwheel Galaxy (in Ursa Major constellation)

If there is enough time, I also explained them how a CCD camera works. Everyone use it on the phone but no one know exactly how it works.

This is more or less how I handle the entire tour. In order to tell all the things I wrote above, to show them the terrace and the two telescopes, and leave enough time for questions, the tour takes approximately 45 minutes. If you have less time, you need to adapt what to show or what to tell them, according to the weather conditions and to your choice.