View results

Respondent

10 Anonymous

16:42
Time to complete

Demonstration video

The video you're about to watch demonstrates the application representing the spectra of a specific galaxy from the CALIFA survey, namely, the NGC 5732 galaxy. Pay attention to the cursor-based binaural sonification and how as we move away from the center of the galaxy the reverberation gets stronger. Picture yourself in a big church: sounds from far away bounce around more than sounds nearby, which are clearer. It's similar when we move away from the center of the galaxy, the reverberation increases. The volume or amplitude of each sound corresponds to the flux of each spectrum.

More information about reverberation at: https://en.wikipedia.org/wiki/Reverberation

ViewCube Demonstration

1

Warning

In the following sections, you will be presented with spectra from different galaxies. We will ask questions about various properties of these spectra. However, we will not provide the names of the galaxies to which they belong to.

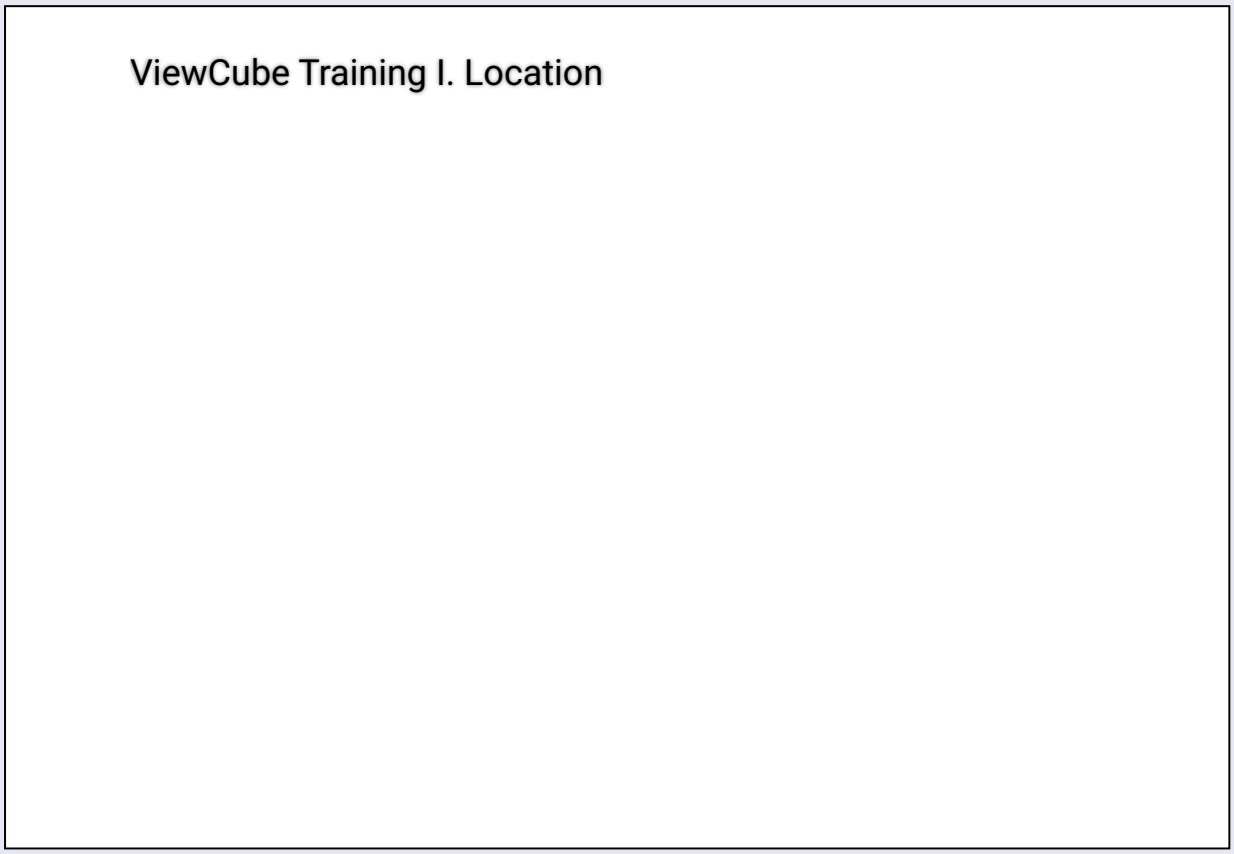
Please check now your headphones. Ensure that the right earpiece (R) is placed in your right ear and the left earpiece (L) is in your left ear. Also check their level to protect your ears. You can readjust it during the test if needed.

This questionnaire is designed to evaluate the performance of the application. So feel relaxed, and answer without any pressure.

Sound Location

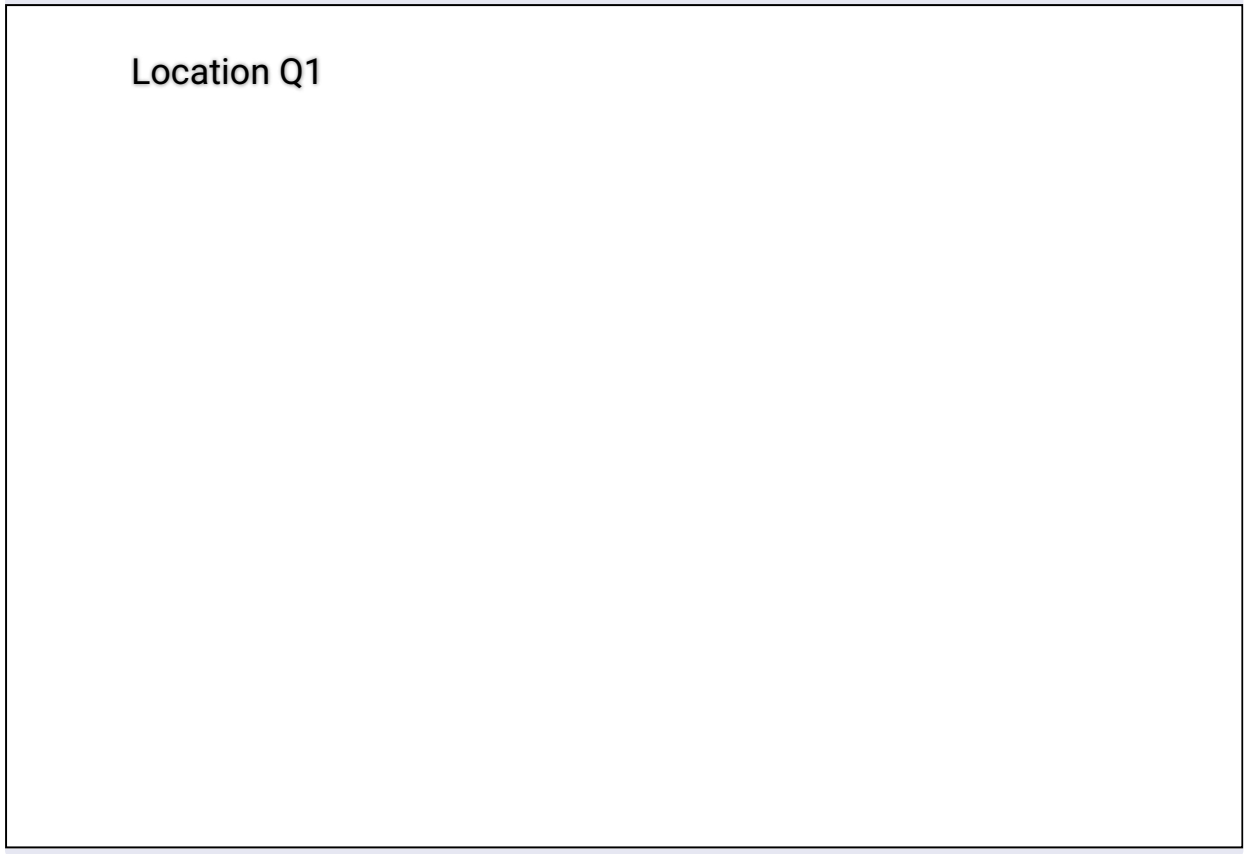
In this section we analyze the possibilities of the application to provide accurate sound location. Play the training video as many times as you need to answer the questions below. Notice how the listener is virtually placed in the center of the galaxy looking at the upper position within the binaural soundscape, while the lower half of the galaxy is perceived behind the listener.

ViewCube Training I. Location



2

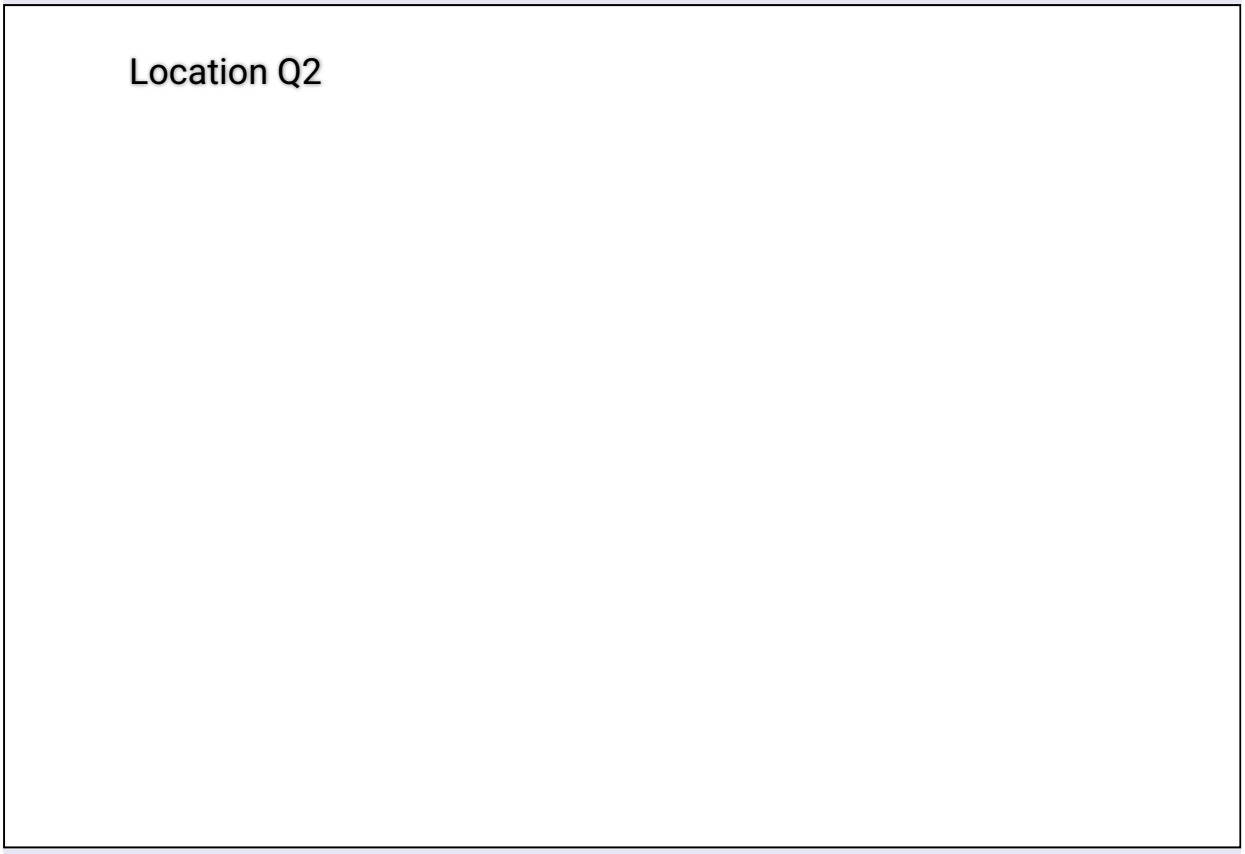
Which sonification is located in the upper position? *



- Sonification 1
- Sonification 2

3

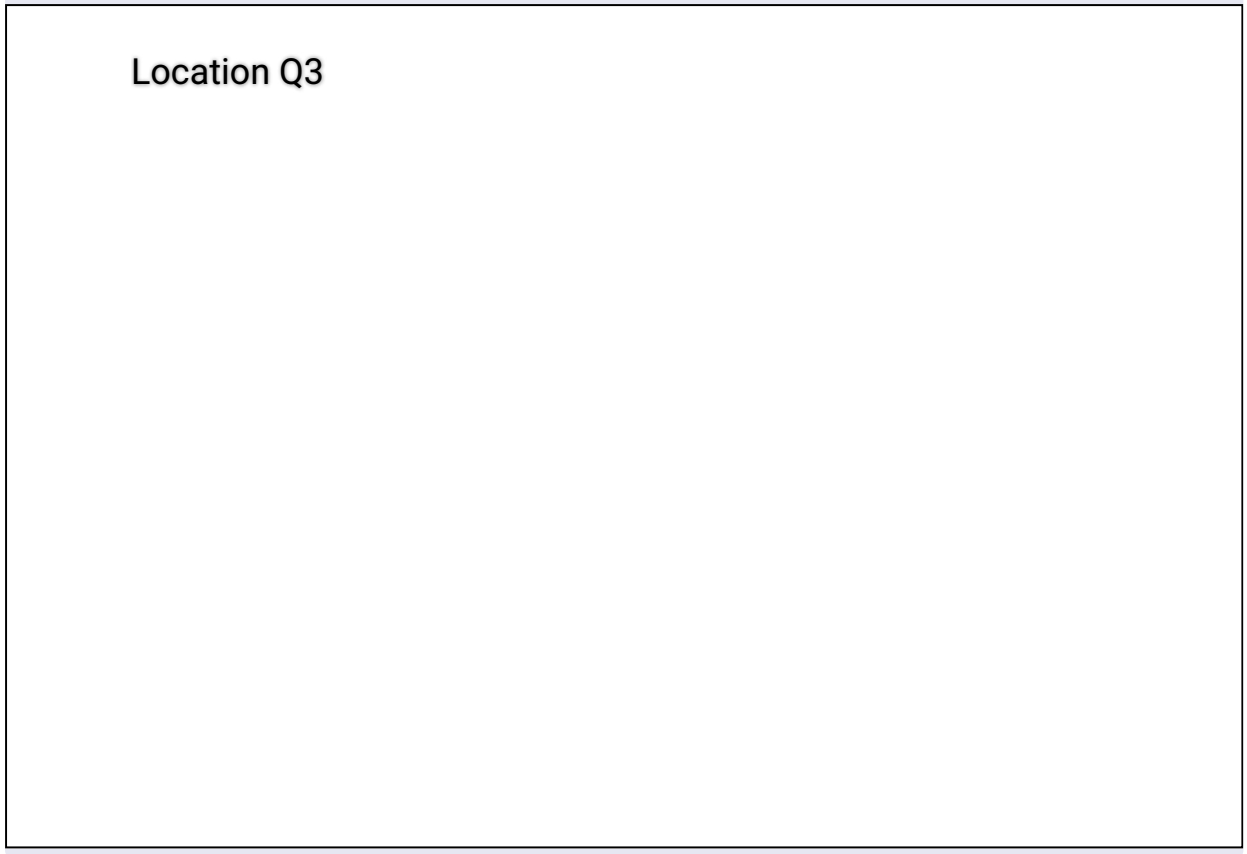
Where is the sound source located? *



- (●) Left
- ( ) Right

4

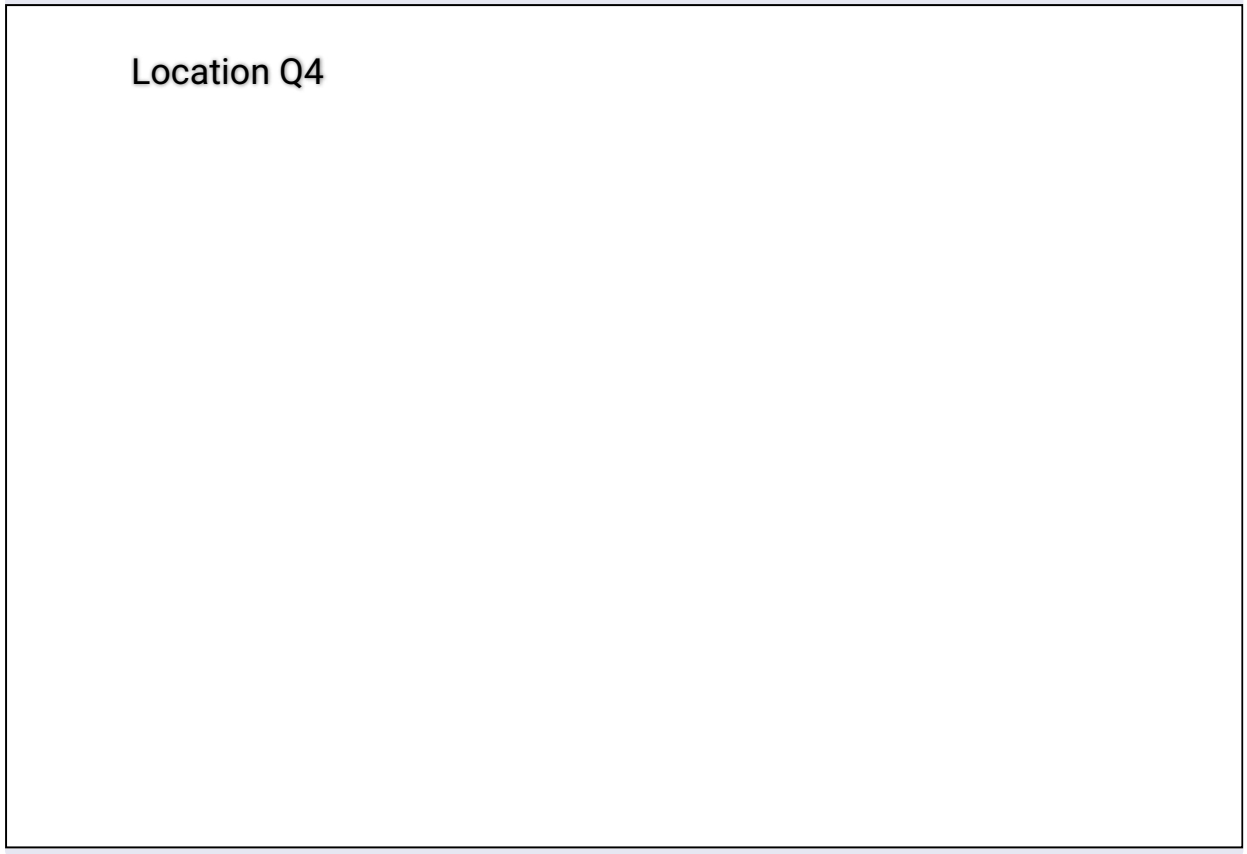
Which sonification is located in the upper-left position? *



- Sonification 1
- Sonification 2
- Sonification 3
- Sonification 4

5

Which sonification do you perceive centered? *



- Sonification 1
- Sonification 2
- Sonification 3
- Sonification 4

Distance to the center of the galaxy

In this section we analyze the possibilities of the application to provide auditory information about the distance of the cursor to the center of the galaxy. Play the training video as many times as you need to answer the questions below.

ViewCube Training II. Distance

6

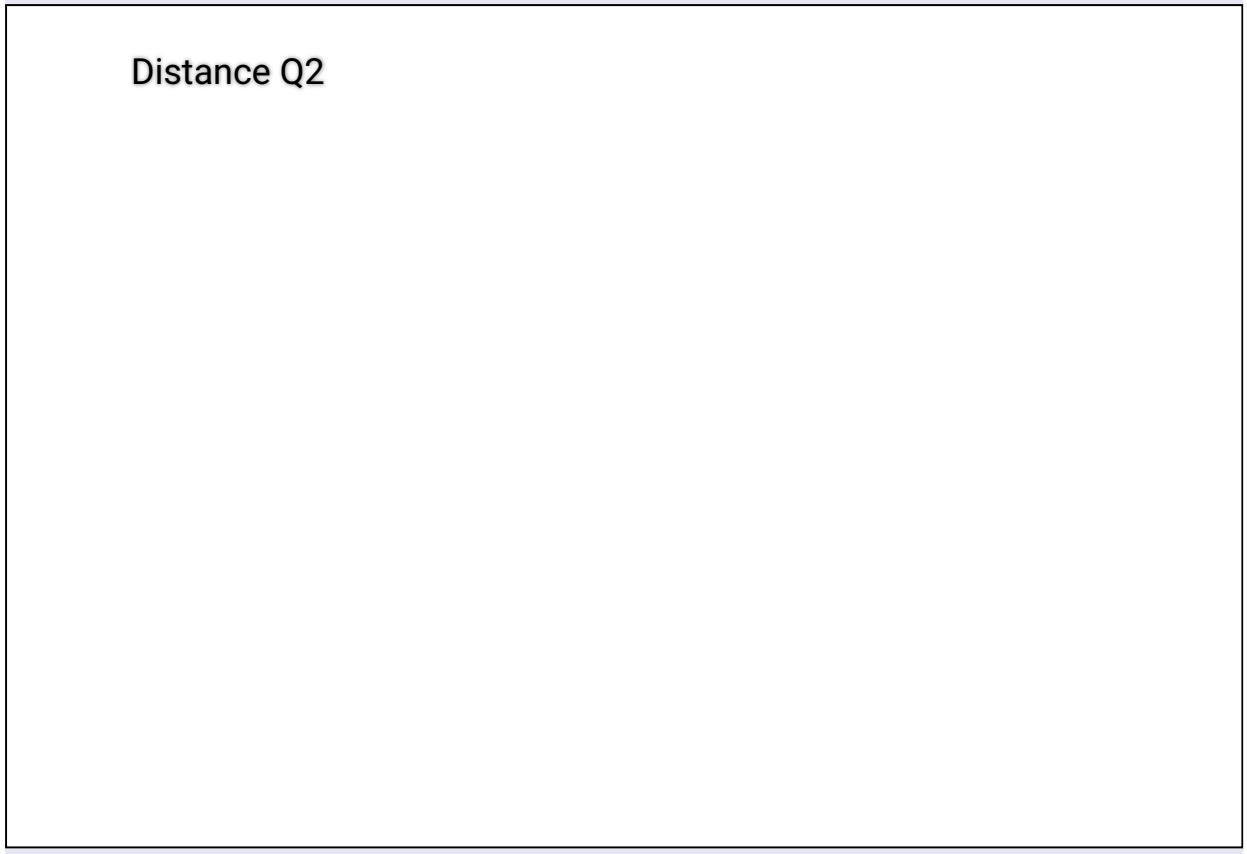
Which of the sonified spectra corresponds to the center of the galaxy? *

Distance Q1

- Spectrum 1
- Spectrum 2
- Spectrum 3

7

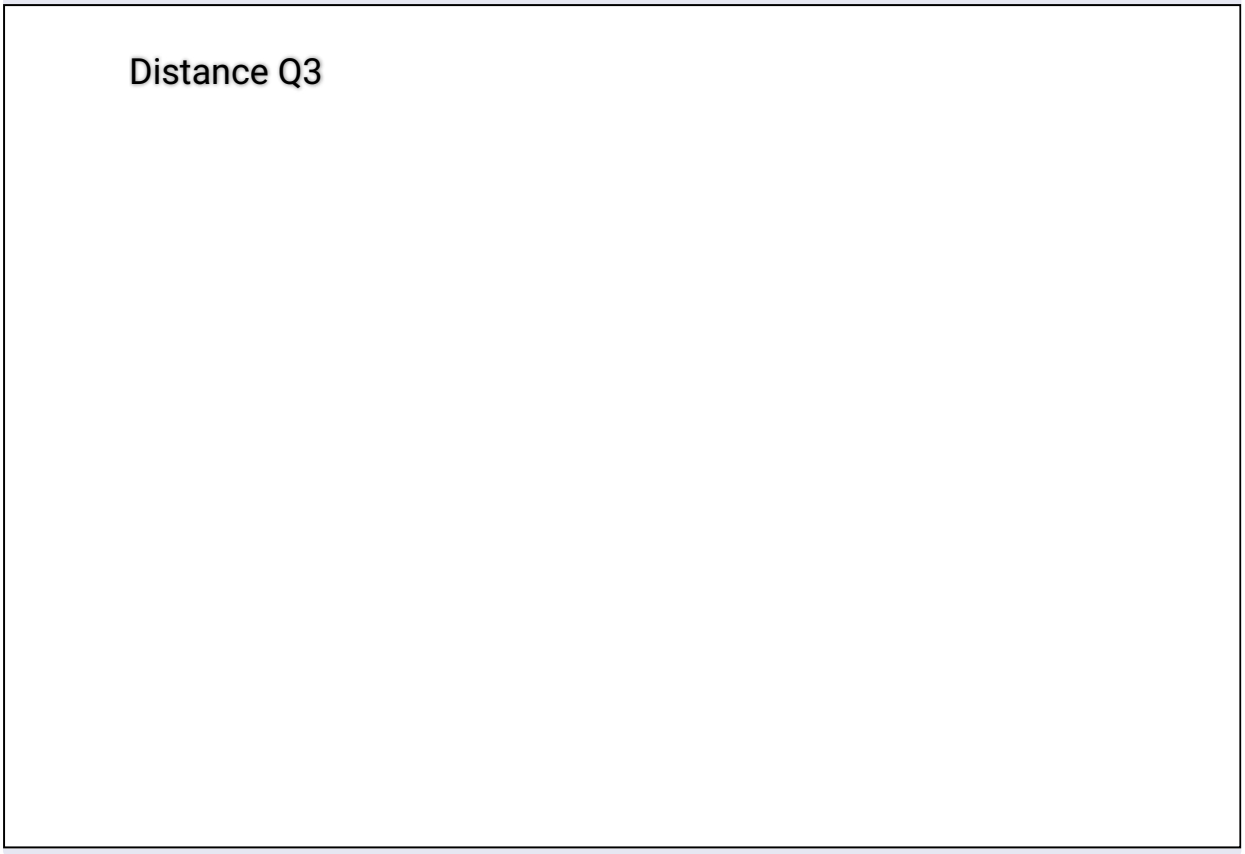
Which spectrum do you perceive furthest from the center of the galaxy? *



- Spectrum 1
- Spectrum 2
- Spectrum 3

8

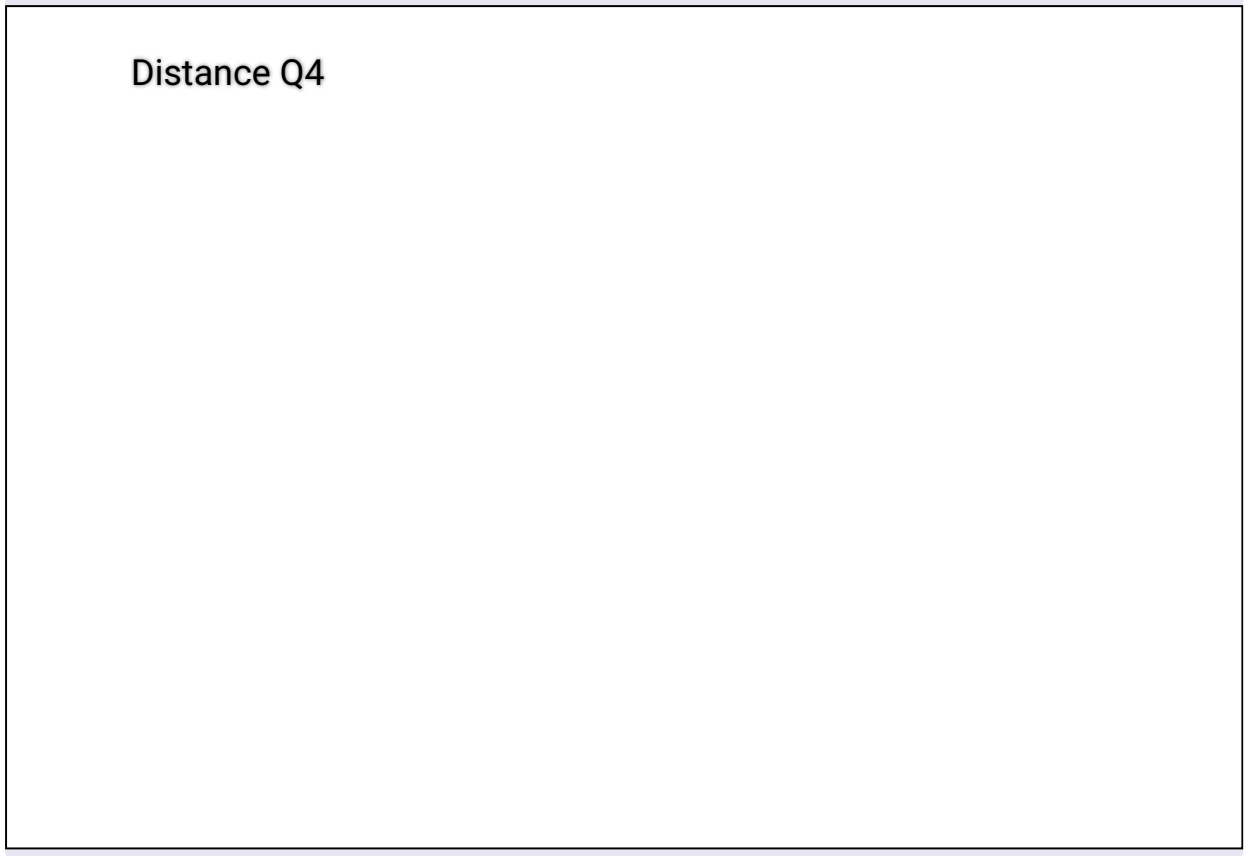
Which spectrum do you perceive closest to the center of the galaxy? *



- Spectrum 1
- Spectrum 2
- Spectrum 3

9

Which spectrum do you perceive at an intermediate distance from the center of the galaxy? *



- Spectrum 1
- Spectrum 2
- Spectrum 3

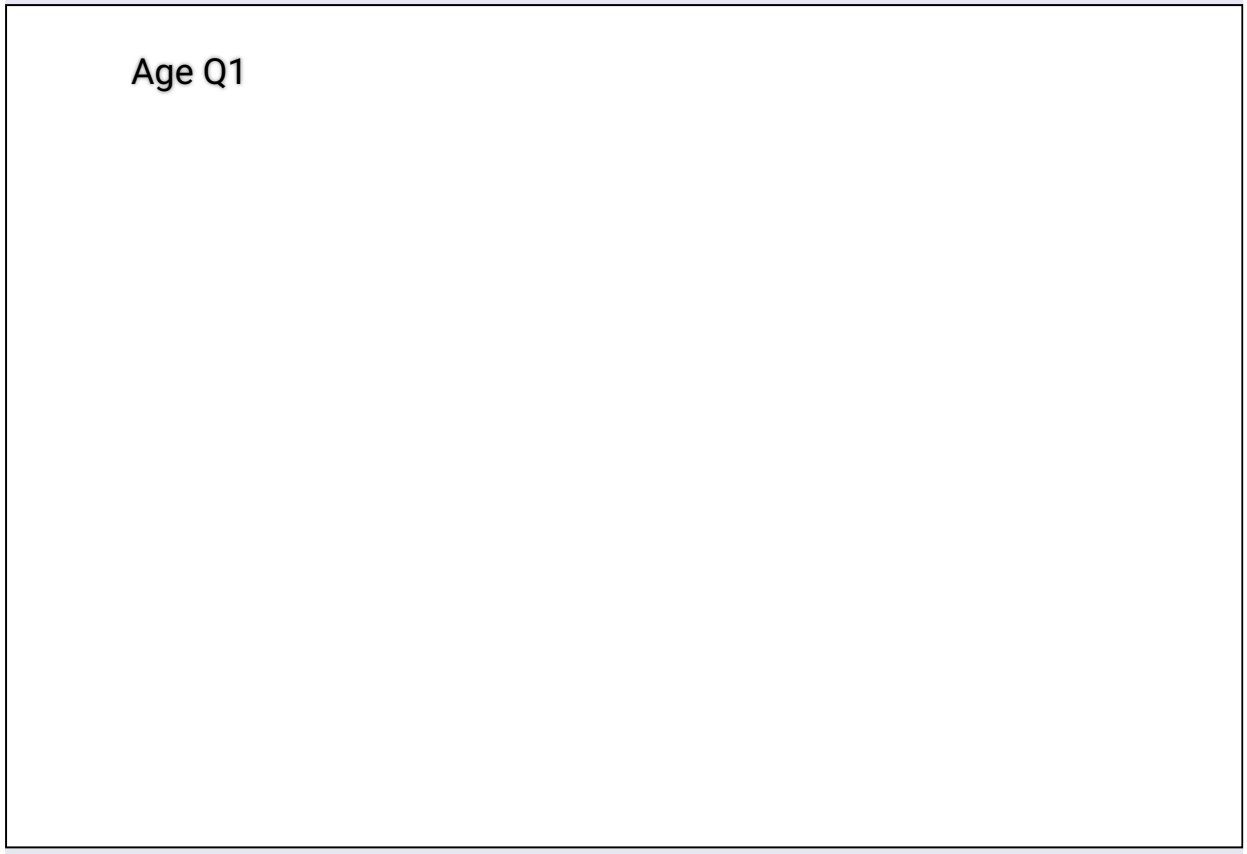
Age/Galaxy types

In this section, we're looking into how multimodal representation assists in distinguishing between various Age/Galaxy types. Essentially, it's about how the sound's quality, mixing timbre and frequency, gives each spectrum its unique identity. So, when you listen to a spectrum's sound, it might display a specific blend of timbre and sound frequency features. Simply watch the training video as many times as needed to answer the questions.

ViewCube Training III. Classification

10

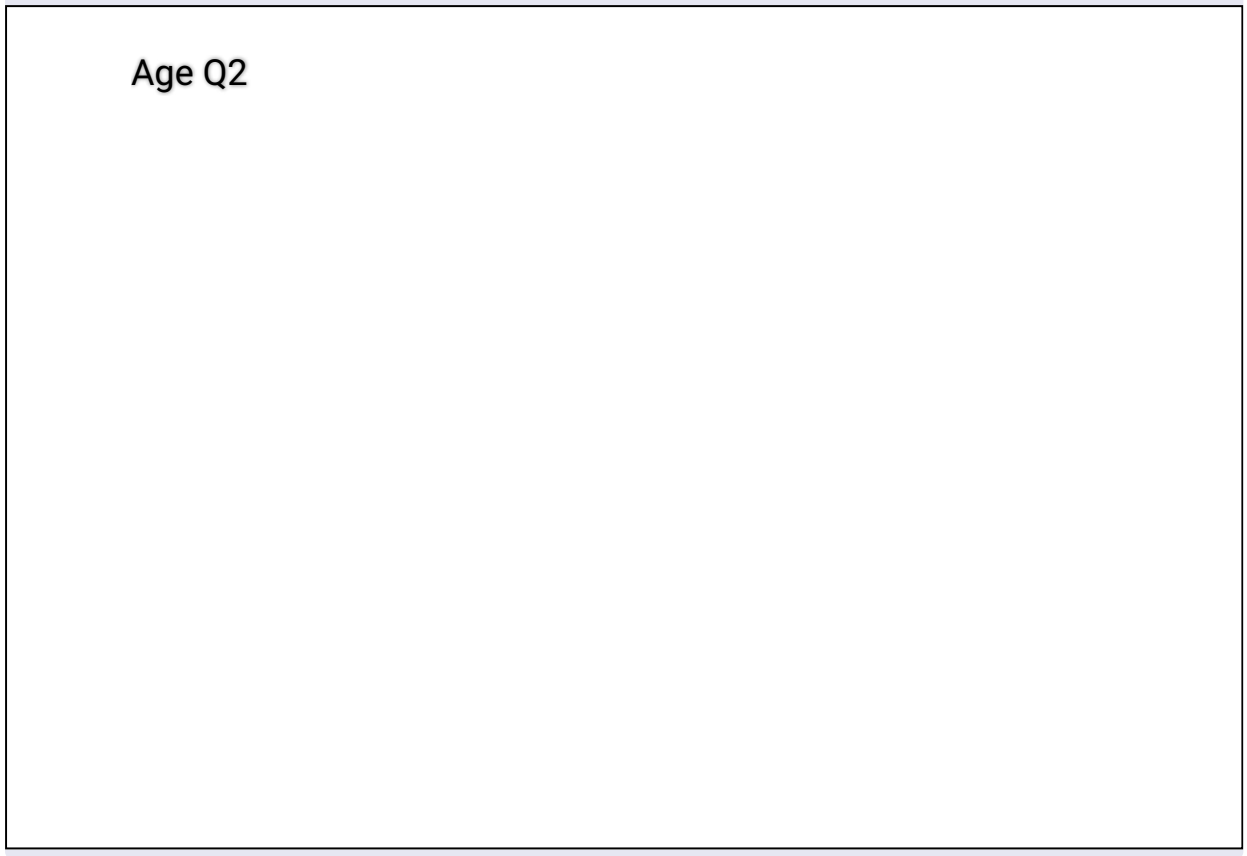
Which of the represented spectra corresponds to a star forming region? *



- Spectrum 1
- Spectrum 2
- Spectrum 3

11

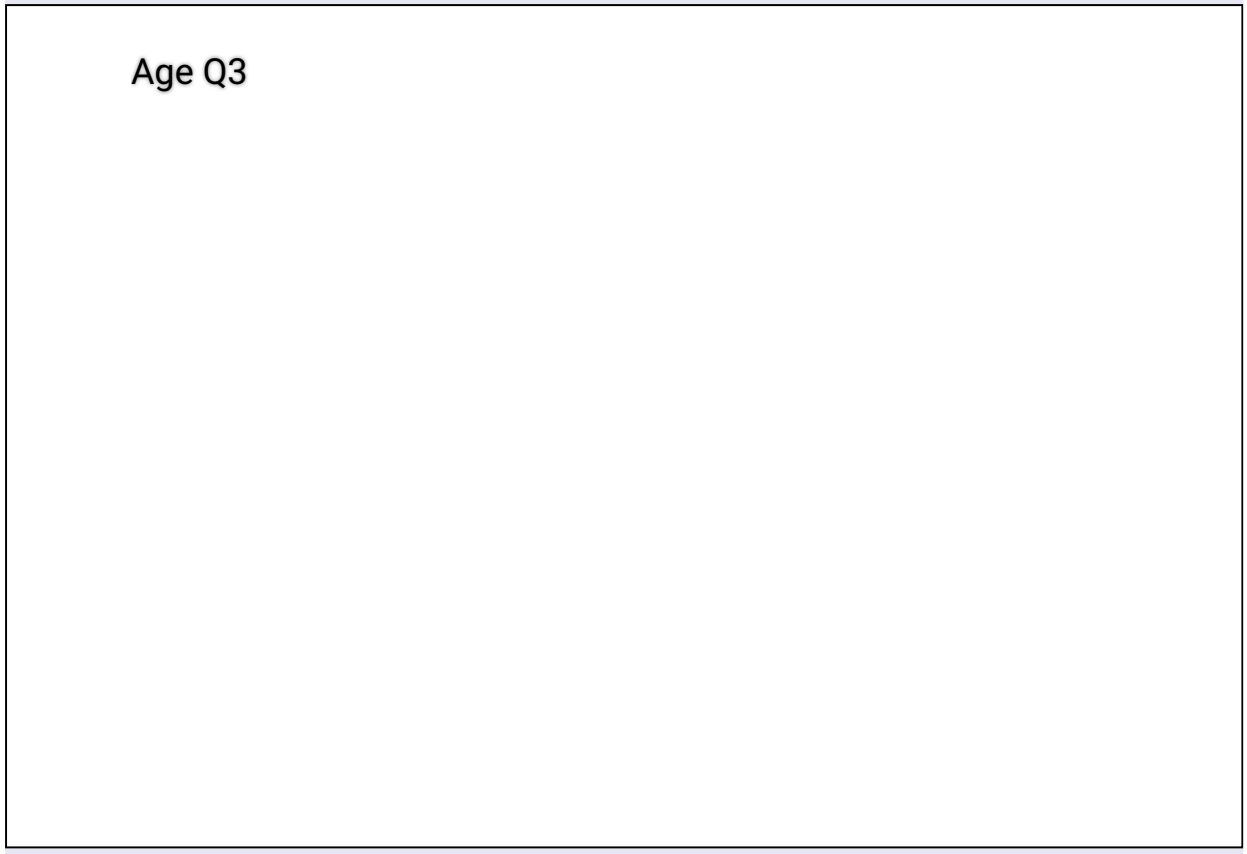
Which of the represented spectra corresponds to a region close to the center of a retired galaxy? *



- Spectrum 1
- Spectrum 2
- Spectrum 3

12

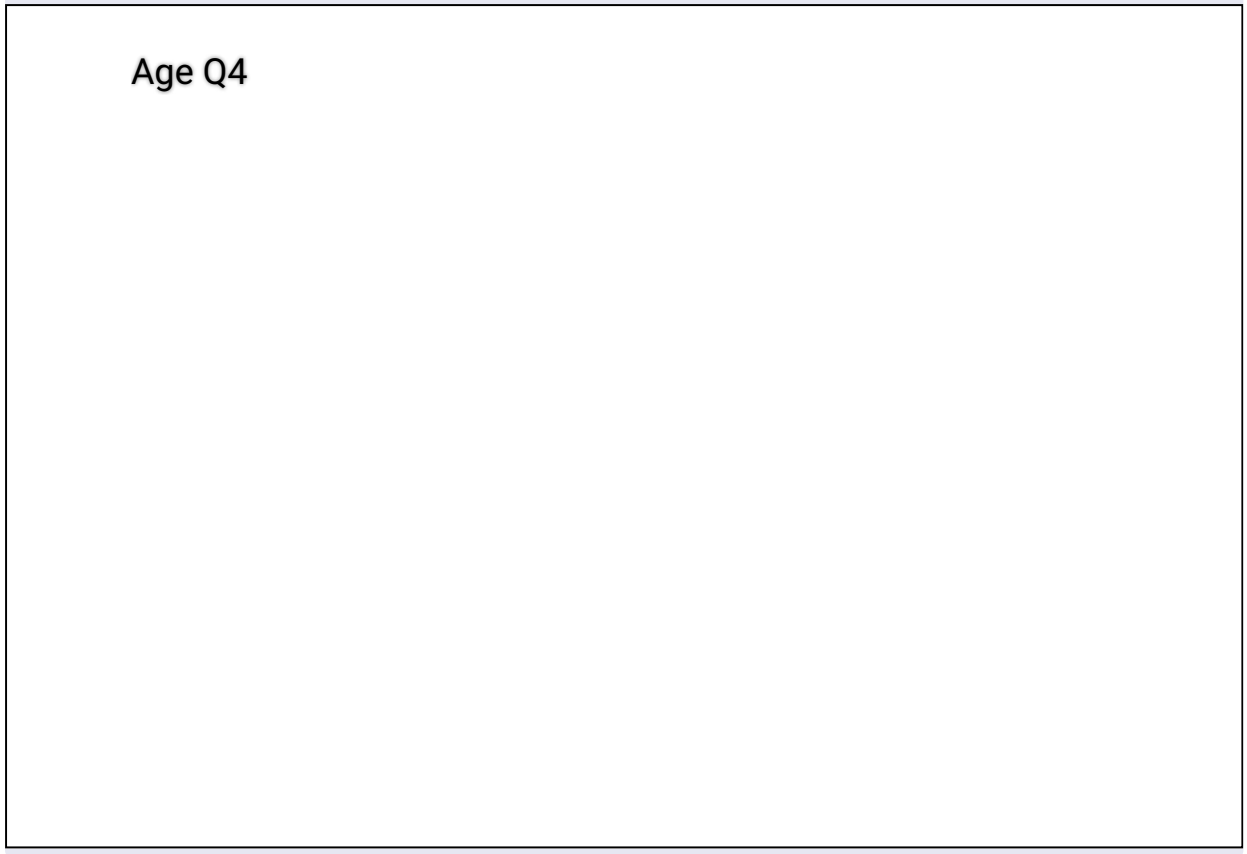
Which of the represented spectra corresponds to an intermediate age galaxy? *



- (●) Spectrum 1
- ( ) Spectrum 2
- ( ) Spectrum 3

13

Which of the represented spectra corresponds to a star forming region? *



- (●) Spectrum 1
- ( ) Spectrum 2
- ( ) Spectrum 3

Combined questions

Finally, with these multiple answer questions we analyze the potential of the application to convey galaxy information through sound, allowing the identification of the position of the represented spectrum (left/right), its distance to the center (close/far), and if it corresponds to a star forming region or to a retired galaxy. Remember to mark several answers.

Summary

14

Can you identify the all the described properties in this sonification? *

Combined Q1

- [x] Close to the center
- [ ] Far from the center
- [ ] Left position
- [x] Right position
- [x] Retired galaxy
- [ ] Star forming region

15

Can you identify the all the described properties in this sonification? *

Combined Q2

- [ ] Close to the center
- [x] Far from the center
- [ ] Left position
- [x] Right position
- [ ] Retired galaxy
- [x] Star forming region

Demographics

This survey is completely anonymous.
Please take a moment to answer the following questions to help us understand how to enhance our application to better meet your needs. We believe that factors such as age, language, and even the type of music you listen to could influence how you perceive sound. Your participation in providing accurate demographic data is essential for us to make meaningful improvements.
Thank you for your cooperation!

16

If you have tried the application in person, please rate the multimodal experience. If not (you only saw the training videos of this questionnaire), please skip this question.

- ○ Very bad
- ◉ Bad
- ○ Acceptable
- ○ Good
- ○ Very good

17

Rate the potential usefulness of the multimodal display for the exploration of the CALIFA Survey. *

- ( ) Useless
- (•) Doubtedly useful
- ( ) Useful
- ( ) Very useful

18

Rate the aesthetics of the sonifications. *

- ( ) Intolerable
- ( ) Bad
- ( ) Acceptable
- (•) Good
- ( ) Nice sounding

19

How experienced are you in astronomical data analysis? *

- ( ) No experienced
- ( ) Some experienced (hobby/enthusiast)
- (•) Very experienced (professional)

20

How experienced are you in music or sound? *

- ○ Not experienced
- ◉ Very basic experience
- ○ Some experienced (hobby/enthusiast)
- ○ Experienced (amateur)
- ○ Very experienced (professional)

21

Please, indicate the type of music you most frequently listen to. *

Chinese Ancient Music

22

How old are you? *

- ○ Under 21
- ◉ 21-30
- ○ 31-40
- ○ 41-50
- ○ 51-60
- ○ Over 60
- ○ Prefer not to say

23

Please indicate if you identify as Blind or Low Vision user (BLV). *

- ○ Yes
- ◉ No

24

Indicate your residence country. *

China

25

Indicate your mother tongue. *

Chinese

26

Please, confirm that you used headphones to answer the questionnaire. *

- (●) Yes, I used headphones
- ( ) No, I didn't

27

Indicate the type of headphones you used (example: stereo, intra-aural) *

- [ ] Stereo
- [ ] 3D audio / Gaming
- [x] I don't know
- [ ] Intra-aural
- [ ] Circum-aural

28

Feedback
You can add any comments or suggestions here:

29

Acknowledgment

This study uses data provided by the Calar Alto Legacy Integral Field Area (CALIFA) survey (https://califa.caha.es/).

Sánchez, S. F., García-Benito, R., Zibetti et al. (2016). CALIFA, the Calar Alto Legacy Integral Field Area survey-IV. Third public data release. Astronomy & Astrophysics, 594, A36.
Sánchez, S. F., Kennicutt, R. C., De Paz, et al. (2012). Califa, the calar alto legacy integral field area survey-i. survey presentation. Astronomy & Astrophysics, 538, A8.