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## 3D visualization and analysis of HI in and around galaxies

Punzo, Davide

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**rijksuniversiteit  
 groningen**

# **3D Visualization and Analysis of HI in and around galaxies**

**PhD thesis**

to obtain the degree of PhD at the  
University of Groningen  
on the authority of the  
Rector Magnificus Prof. E. Sterken  
and in accordance with  
the decision by the College of Deans.

This thesis will be defended in public on  
Friday 26 May 2017 at 16.15

by

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*“Visual Analytics, the combination of automated data processing and human reasoning, creativity and intuition, supported by interactive visualization, enables flexible and fast interaction with the 3D data, helping the astronomer to deal with the analysis of complex galaxies.”*

– Chapter 2

Cover:

The front page illustrates the HI component of WEIN069, one of the visualization Use Cases studied in this thesis. The three figures are different visual representations of the HI data (from left to right): position-velocity (P-V) diagram, velocity field and volume rendering. Data for this study were collected by Mpati Ramatsoku using the *Westerbork Synthesis Radio Telescope*.

The background image represents a dream-like abstraction image of a motherboard circuit. The image has been processed using the open-source DeepDream neural network code developed by Google Inc. (<https://deepdreamgenerator.com/>).

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