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## **Radio emission from merging galaxy clusters : characterizing shocks, magnetic fields and particle acceleration**

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# Radio emission from merging galaxy clusters

characterizing shocks, magnetic fields and particle acceleration

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# Radio emission from merging galaxy clusters

characterizing shocks, magnetic fields and particle acceleration

## Proefschrift

ter verkrijging van  
de graad van Doctor aan de Universiteit Leiden,  
op gezag van Rector Magnificus prof. mr. P. F. van der Heijden,  
volgens besluit van het College voor Promoties  
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Reinout Johannes van Weeren

geboren te De Bilt  
in 1980

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The cover shows a GMRT 150 MHz radio image of the field around the galaxy cluster CIZA J2242.8+5301. LOFAR antennas are visible at the bottom.

GMRT image by Huib Intema.

Cover design by Brigitta van Weeren.

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