1. Record Nr. UNINA9910254572903321

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| Titolo | Heteronuclear Efimov Scenario in Ultracold Quantum Gases [[electronic resource] ] : Universality in Systems with Large Mass Imbalance / / by Juris Ulmanis |
| Pubbl/distr/stampa | Cham : , : Springer International Publishing : , : Imprint : Springer, , 2017 |
| ISBN | 3-319-51862-3 |
| Edizione | [1st ed. 2017.] |
| Descrizione fisica | 1 online resource (XVIII, 125 p. 45 illus., 44 illus. in color.) |
| Collana | Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053 |
| Disciplina | 539.7 |
| Soggetti | Phase transformations (Statistical physics)<br>Condensed materials<br>Quantum physics<br>Low temperature physics<br>Low temperatures<br>Quantum Gases and Condensates<br>Quantum Physics<br>Low Temperature Physics |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Nota di bibliografia | Includes bibliographical references. |
| Nota di contenuto | Introduction -- Two-body Interactions Between Li and Cs Atoms -- Universality of LiCs2 Efimov Resonances -- Short-range Effects in LiCs2 Efimov Resonances.-Conclusion and outlook. |
| Sommario/riassunto | This thesis represents a decisive breakthrough in our understanding of the physics of universal quantum-mechanical three-body systems. The Efimov scenario is a prime example of how fundamental few-body physics features universally across seemingly disparate fields of modern quantum physics. Initially postulated for nuclear physics more than 40 years ago, the Efimov effect has now become a new research paradigm not only in ultracold atomic gases but also in molecular, biological and condensed matter systems. Despite a lot of effort since its first observations, the scaling behavior, which is a hallmark property and often referred to as the “holy grail” of Efimov physics, remained |

hidden until recently. In this work, the author demonstrates this behavior for the first time for a heteronuclear mixture of ultracold Li and Cs atoms, and pioneers the experimental understanding of microscopic, non-universal properties in such systems. Based on the application of Born-Oppenheimer approximation, well known from molecular physics textbooks, an exceptionally clear and intuitive picture of heteronuclear Efimov physics is revealed.