

## CONTENTS

### *Mathematical and Computational Physics*

- E. ALBAYRAK. The XYZ model in the mean-field approximation in terms of Pauli spin matrices.....1

### *Atoms and Molecules*

- D. NARKEVIČIUS and S. TOLIAUTAS. Predicting nonradiative decay barrier of BODIPY dye in polar environment by applying ONIOM multiscale method.....11
- G. GAIGALAS, P. RYNKUN, and L. KITOVIEŅĒ. Second-order Rayleigh–Schrödinger perturbation theory for the GRASP2018 package: Core–valence correlations.....20

### *Condensed Matter Physics and Technology*

- O. HAVRYLIUK, O. TKACHUK, M. TEREbinska, O. SEMCHUK, and A. BILIUK. Optical characteristics of structures with silicon nanowires and metal nanoparticles.....40

### *Environmental Physics*

- D. LINGIS, M. GASPARIŪNAS, V. KOVALEVSKIJ, A. PLUKIS, and V. REMEIKIS. Numerical simulation of proton backscattering spectra in GEANT4 toolkit.....48

### *Interdisciplinary Physics*

- D. TOGOBITSKA and A. BELKOVA. New approach to evaluating the thermodynamic consistency of melts in the ‘metal-slag’ system based on interatomic interaction parameters.....58