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## The charmonium spectroscopy and charmonium decay at BESIII

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With the world largest data samples taken at  $J/\psi$ ,  $\psi'$ , and  $\psi''$  peaks with the BESIII detector at the BEPCII  $e^+e^-$  collider. The charmonium spectroscopy and charmonium decay dynamics are studied. We report new measurements of the resonant parameters of the spin-singlet states,  $\eta_c$ ,  $\eta_c'$ , and  $h_c$ , and their production rates in  $\psi'$  transitions; we also report observations of many new decay modes of  $J/\psi$ ,  $\psi'$ ,  $\chi_{cJ}$ , and  $\eta_c$ , and improved measurements of many existing modes.

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