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QCD studies and discoveries with e+e- colliders and future perspectives

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Observations of new charmonium(-like) and bottomonium(-like) states (sometimes refered to as “XYZ” states) at e+e- colliders have changed our picture of quarkonia systems as QCD bound states. Potential models with a linear confinement ansatz, which were able to predict many conventional states with an accuracy of ~1 MeV, absolutely fail in describing many of the new states. Symmetries play an important role e.g. in the determination of the quantum numbers (such as charge conjugation in the radiative decays) or in trying to explain surprising properties such as isospin violation. It will also be discussed, how future experiments (Panda, Belle II) can help to understand the nature of these states.

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