Recent development of the theory of doubly nonlinear equations arising in phase transitions

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There are many mathematical models of phase transitions, which can be described as doubly nonlinear evolution equations of the form

$$\frac{du}{dt} + A\left(\frac{du}{dt}\right) + B(u) \;=\; f(u)$$

in Hilbert or Banach spaces. In particular, some models of irreversible phase transition are written in this form. In case one of nonlinear operators A and B is bounded, some results, which guarantee the existence of (weak) solutions, have been obtained. But, in case both of them are unbounded, there are not so many works dealing with existence question. In this talk we discuss it again in connection with phase transition.