Subject:
The term "interaction" is used in physics in different contexts. Thereby its meaning does not always coincide with that in the colloquial language.

Deficiencies:
In physics the term "interaction" stands for several different phenomena and processes.
1. The word is used when two bodies exert forces on each other in the sense of Newton’s Third Law. At first glance it seems that here the term interaction is appropriate. When a body A exerts a force on another body B, according to the Third Law B also exerts a force on A. Since we say that a force "acts", we are dealing here with two actions: A on B and B on A. We thus have an "interaction", even in the colloquial use of the word. However, this observation leads us to a first problem. The term interaction is suitable only as long as one describes the process with the Newtonian model of an action at a distance. The description refers to only two systems, which are well separated: body A and body B. However, since more than a hundred years we no longer need this provisional description, since we are now convinced that any action is based on the transport of a physical quantity. In particular, a Newtonian force is nothing else than a momentum transport. If the spring (we imagine it to be massless) pulls bodies A and B toward each other, Fig. 1, the momentum of A increases and that of B decreases. But it is not that at B momentum disappears and at A reappears. Rather, it is transferred via an intermediate medium or system C – in our case the spring. Thus it is possible to specify how the momentum gets from B to A. On these grounds it is not appropriate to say that there is an interaction. When a partner B gives something away and A receives it, it would be more convenient to say that there is a transfer, a transport or a transmission. When someone is pouring water from one bucket into another, it would not characterize the process suitably to say that there is an interaction between the buckets.

Fig. 1. The spring is under tensional stress. The momentum of A increases, that of B decreases (the "negative momentum" of B increases).

2. In particle physics one distinguishes between the particles of matter (hadrons and leptons) and the bosonic interaction particles (sometimes called interaction carriers or force mediators). In this field the term interaction means that a certain particle is created or annihilated. Since there are four kinds of boson fields there are also four different interactions: electromagnetic, gravitational, weak and strong. These processes include the interaction in the classical sense, i.e. the case that between two particles (of matter) momentum is transferred, while the nature of the particles is not changed (an example is electron-electron scattering). In addition, they include processes in which two interaction particles "interact" (example: photon-photon or gluon-gluon). But there are also processes in which particles of matter change their nature (an example is the beta decay in which a proton transforms into a neutron, an electron and a neutrino). It can be seen that here the term "interaction" does no longer coincide with the colloquial interaction. Rather the term describes something that might better be called a reaction (in the sense of chemistry).

3. In other subfields of physics the word is used in an even broader sense, namely for the description of the various processes in which two or more subsystems are involved. Now, one can hardly conceive a process for which this is not the case, so that eventually everything becomes an interaction. It sounds all well and scientific, when something is called an interaction, even if nothing concrete is said.

Origin:
Newton did not use the term, there was no "interactio". For him there were only "actio" and "reactio". In the following time his Third Law was not yet called law of interaction, but law of counteraction. By the end of the 19th century, the term "interaction" appears in the scientific literature, see for example in the Science of Mechanics by Ernst Mach. But the word got its immense popularity much later, probably in the second half of the 20th century, when every physical process involving two sub-systems became an interaction.

Disposal:
1. Formulate Newton’s Third Law without actions at a distance: The momentum which body B loses, is transferred to body A.
2. In the context of the four bosonic fields the term has acquired a specific meaning. Although the word was not the best choice, we have to accept it as a new technical term with its own meaning.
3. A parsimonious use of the word makes every text clearer.

Friedrich Herrmann