

## Concept of entity interactions as a response to a field

Any student that studies Physics will be introduced to the concept of a field. A field in physics is basically to assign a set of values of a physical property to a set of locations in physical space so as to define and describe, or model that physical property as a function of locations in a physical space.

How is a field of one or more physical properties defined? Generally, by measurement of the physical property in question, such as temperature, or the behaviour of an entity in the presence of another. All such fields in essence are the product of an interaction of an entity to its immediate local environment at a given location in space. Temperature, for example, is the interaction of the measurement device to the energy that is at the location of the device altering its physical state, that in turn, gives a result that is defined as a measurement of temperature. This interaction of energy is commonly the transfer of kinetic energy from one entity to another through collision, such as a gas onto a metal or liquid which changes the physical properties of the metal or liquid to change one or more of its physical states, such as volume, shape, or electrical conductivity etc.

The familiar fields of physics where the interaction seems to have no such kinetic energy transfer of entities, are fields that change the motion of an entity by a seemingly invisible action at a distance phenomenon. Gravity and electromagnetism being the prime and familiar examples of this. These fields can be considered as fields of interaction between entities that share a common physical property between them, where the physical property of one entity influences the physical state, such as motion, of all other entities surrounding it that share that same physical property, and all those entities having this same physical property in turn influences the motion of the entity in question. This is a feed back loop of interaction.

The most familiar of this kind of interaction is that of an entity that has a property of mass that is associated with it. A gravitational influence is observed and defined on all other entities that have a mass. That influence is measured in the space around the entity by means of measuring the change in motion, and hence acceleration of those masses. This change in motion is defined as a force, and thus a gravitational field is defined as a field of gravitational force measured and given by Newtons law of gravitation. Einstein later modified and improved this theory into one of general relativity of gravitation.

Electromagnetism has also a similar property of entities possessing an electric charge that changes the motion of entities, which then are attributed to some electromagnetic field surrounding each entity.

It can be argued that entities do not interact with other entities in a kind of billiard ball like transfer of kinetic energy, but do so through their fields, and more accurately, the summation of their fields. The motion of entities also influences the interaction such that a faster moving entity has a different interaction to that of a slower moving one.

What is commonly referred to as entities interacting with each other is incorrect in that it is not that entities are interacting with each other, but rather that it are the fields of each entity that are interacting with each other. If one can consider that the fundamental entities that make up the matter of the universe are in fact not particles of matter, but are fields condensating out of some more fundamental universal field, then one may consider that interactions of matter is the interaction of the fields that make up matter.

This interaction of fields can be analogous to a kind of ocean of field densities, where the higher densities of field interaction are like the crest of waves on the ocean, and lower densities being the troughs. The observed physical behaviour of an entity can be interpreted as a reaction to its local environment of where on an ocean of field density it resides. Eg on an unchanging flat field surface, or one where there is a gradient pushing it in a direction of higher or lower energy density. Change of an entity state such as motion can be defined as due to a force. But physics also defines that to change the physical state of a property of an entity such as motion, it also requires energy.

Thus a defined observed force that is attributed to a field existing about an entity can also be considered as an expression of energy. Such an expression and consideration of a force being an expression of energy then translates that a defined field about an entity is also an expression that the field is a form of energy. This can be said to be equivalent to the potential energy that is used in physics. What then can be proposed is that the interactions of entities through their fields could be interpreted as an interaction of energy. That is, a field about an entity is that of an energy field of a particular kind that interacts with the same or other energy fields in a particular manner to create a resultant energy field in which defined entities of matter then react to.

On the surface, observed physical phenomenon such as the motion of entities argued here, is a result of a reaction to a resultant field of energy that is a consequence to some physical property that the entities possess, such as for gravitation, mass. In some manner, matter with a physical property of mass creates, or is associated with a field in space of a form of energy that the mass and velocity of any entity at that location reacts to in the form of changing its direction of motion.

In summary, the following axioms are proposed.

**Axiom EIF-01:** A defined physical property of an entity in which responds or interacts with one or more entities that possess the same property can be stated that the physical property has associated with it a defined field in physical space.

**Axiom EIF-02:** The field of a defined physical property of an entity in which responds or interacts with one or more entities interacts with the fields of all other entities in such a manner as to produce a resultant net field of that property. This interaction is commonly observed to be a summation.

**Axiom EIF-03:** The resultant interaction of an entity with a certain physical property to all other entities with the same property is an interaction with the resultant field of that property as defined in **Axiom EIF-02**.

**Axiom EIF-04:** The resultant field in which all entities interact with can be considered as a field of energy of that physical property as anything that changes its physical state such as motion does so as a reaction to energy that is supplied to it.

The greater question of how a field is generated, or exists, with the question of if the physical property that is associated with an entity such as mass, is, in itself, an expression of a result of a field condensing into a location in space where it is defined that the entity exists is left for another discussion.