

Chapter 1 : Phase transition - Wikipedia

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for those lockers with student numbers no longer in the student file String: List that shows all lockers in the locker file assigned to student numbers which are no longer in the STU file, sorted by locker number String: IMM labels to parents Description: HIS list of students by spring term teacher with math grades Description: HIS grade for all courses 1st term Description: List of HIS students grades for all courses from the 1st term of the year String: GRD total marks for specific courses by number Description: Total of each grade mark given for specific courses sorted by crs and mark String: GRD list all grades by specific teacher Description: List of students with all grades given by specific teachers sorted by teacher and course String: GRD total number of comment 1 entries by code Description: SN to match the STU. CRS list of courses by course number Description: ATT possible no show list Description: List to find students who show as entering and leaving on the same day possible no show list if date is the 1st day of school String: ATT list with section number, date and code Description: List of students with their section number, attendance date, attendance code if any from 1st period for a specific section on a specific date String: ATT list of absence entries for specific day Description: Print Labels for Contacts Description: To print birthdays for a particular month, by teacher Elementary Schools Notes: Close select query, click on Report and page break by teacher. Class List for Elementary Schools Description: Class list for Elementary Schools String: STU change user code 8 to tag citizenship Description: SSS change to unlock selected courses Description: Change to unlock selected SSS courses by course number String: SEC list students who have no classes Description: Labels for informational purposes for 1st period, fall semester teachers: HIS change credits completed to match the credits attempted Description: Change the HIS credits completed to match the credits attempted if a student received a specific mark String: HIS data in a selected subject area sorted by grade Description: List of students and their HIS data in a selected subject area sorted by grade. Also to identify students deficient in a given subject area String: List of students who have missing marks in either M2, Citizenship, Work Habits, Comment 1 sorted alpha by teacher String: CRS change to add "A" before all course numbers Description: Change to add "A" before all course numbers String: COL labels for specific colleges Description: Labels for specific colleges addressed to Director of Admissions Notes: STU list of students with a blank line for data entry Description: ATT code change Description:

Teacher's Guide Level D (Cr Mastering Math) by Cr Mastering Math Practice LV C '04 (Cr Author: Steck-Vaughn, Title: Cr Mastering Math Practice LV C '04 (Cr Mastering Math).

Fri Dec 11, 7: Enough Damage to kill every enemy in one round. His damage ability was You know what, you are right. Here are some CR 14 enemies: Nightshade HP AC You literally autohit all but one enemy, and you automatically double kill any CR 14 enemy with a single full attack. The fact that not even counting your Hp damage guaranteed every round, you still one round most CR 14 enemies on Con damage alone. You are fuckin retarded. That is the only possible answer. You only got two on each elemental that approached you. The following round of course, you would have moved and full attacked killing of them, but whatever. Broken items, like silksteel armour: Really, most of the stuff that made the character more powerful were things like how You got an entire 14th level WBL, the fact that you wanted free Armors in addition to that, that are better than the one you had to spend money on because they come with abilities. Yes, that was dumb. Even then, I actually felt that the fighter I made was possibly weaker than it could have been. You know what one method of determining what an acceptable power level is? Failing that, you could compare yourself against the other characters in the party. Failing that, you could recognize that you are playing a Tome character in a non Tome game, and so are by default more powerful than everyone else already. Like you were trying to prove that my character was unbalanced, or something. I know you are retarded, but this is just silly. And keeps optimizing how to rake the yard using the handle instead of the head. Last edited by Kaelik on Fri Dec 11, 7:

Chapter 3 : The Gaming Den :: View topic - Make Fighter PrCs Essential

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A typical phase diagram. The dotted line gives the anomalous behavior of water. A small piece of rapidly melting solid argon simultaneously shows the transitions from solid to liquid and liquid to gas. Comparison of phase diagrams of carbon dioxide red and water blue explaining their different phase transitions at 1 atmosphere A eutectic transformation, in which a two component single phase liquid is cooled and transforms into two solid phases. The same process, but beginning with a solid instead of a liquid is called a eutectoid transformation. A peritectic transformation, in which a two component single phase solid is heated and transforms into a solid phase and a liquid phase. A spinodal decomposition, in which a single phase is cooled and separates into two different compositions of that same phase. Transition to a mesophase between solid and liquid, such as one of the " liquid crystal " phases. The transition between the ferromagnetic and paramagnetic phases of magnetic materials at the Curie point. The transition between differently ordered, commensurate or incommensurate, magnetic structures, such as in cerium antimonide. The martensitic transformation which occurs as one of the many phase transformations in carbon steel and stands as a model for displacive phase transformations. Changes in the crystallographic structure such as between ferrite and austenite of iron. Order-disorder transitions such as in alpha- titanium aluminides. The dependence of the adsorption geometry on coverage and temperature, such as for hydrogen on iron The emergence of superconductivity in certain metals and ceramics when cooled below a critical temperature. The transition between different molecular structures polymorphs, allotropes or polyamorphs, especially of solids, such as between an amorphous structure and a crystal structure, between two different crystal structures, or between two amorphous structures. Quantum condensation of bosonic fluids Bose-Einstein condensation. The superfluid transition in liquid helium is an example of this. The breaking of symmetries in the laws of physics during the early history of the universe as its temperature cooled. Isotope fractionation occurs during a phase transition, the ratio of light to heavy isotopes in the involved molecules changes. When water vapor condenses an equilibrium fractionation, the heavier water isotopes ^{18}O and ^2H become enriched in the liquid phase while the lighter isotopes ^{16}O and ^1H tend toward the vapor phase. This condition generally stems from the interactions of a large number of particles in a system, and does not appear in systems that are too small. It is important to note that phase transitions can occur and are defined for non-thermodynamic systems, where temperature is not a parameter. In these types of systems other parameters take the place of temperature. For instance, connection probability replaces temperature for percolating networks. At the phase transition point for instance, boiling point the two phases of a substance, liquid and vapor, have identical free energies and therefore are equally likely to exist. Below the boiling point, the liquid is the more stable state of the two, whereas above the gaseous form is preferred. It is sometimes possible to change the state of a system diabatically as opposed to adiabatically in such a way that it can be brought past a phase transition point without undergoing a phase transition. The resulting state is metastable, i. This occurs in superheating, supercooling, and supersaturation, for example. Ehrenfest classification[edit] Paul Ehrenfest classified phase transitions based on the behavior of the thermodynamic free energy as a function of other thermodynamic variables. First-order phase transitions exhibit a discontinuity in the first derivative of the free energy with respect to some thermodynamic variable. Second-order phase transitions are continuous in the first derivative the order parameter, which is the first derivative of the free energy with respect to the external field, is continuous across the transition but exhibit discontinuity in a second derivative of the free energy. The magnetic susceptibility, the second derivative of the free energy with the field, changes discontinuously. Under the Ehrenfest classification scheme, there could in principle be third, fourth, and higher-order phase transitions. For instance, in the ferromagnetic transition, the heat capacity diverges to infinity. The same phenomenon is also seen in superconducting phase transition. Modern classifications[edit] In the modern classification scheme, phase transitions are divided into two broad categories, named similarly to the Ehrenfest

classes: During such a transition, a system either absorbs or releases a fixed and typically large amount of energy per volume. During this process, the temperature of the system will stay constant as heat is added: Familiar examples are the melting of ice or the boiling of water the water does not instantly turn into vapor , but forms a turbulent mixture of liquid water and vapor bubbles. Imry and Wortis showed that quenched disorder can broaden a first-order transition. That is, the transformation is completed over a finite range of temperatures, but phenomena like supercooling and superheating survive and hysteresis is observed on thermal cycling. They are characterized by a divergent susceptibility, an infinite correlation length, and a power-law decay of correlations near criticality. Examples of second-order phase transitions are the ferromagnetic transition, superconducting transition for a Type-I superconductor the phase transition is second-order at zero external field and for a Type-II superconductor the phase transition is second-order for both normal-stateâ€”mixed-state and mixed-stateâ€”superconducting-state transitions and the superfluid transition. In contrast to viscosity, thermal expansion and heat capacity of amorphous materials show a relatively sudden change at the glass transition temperature [7] which enables accurate detection using differential scanning calorimetry measurements. Lev Landau gave a phenomenological theory of second-order phase transitions. Apart from isolated, simple phase transitions, there exist transition lines as well as multicritical points , when varying external parameters like the magnetic field or composition. Several transitions are known as infinite-order phase transitions. They are continuous but break no symmetries. The most famous example is the Kosterlitzâ€”Thouless transition in the two-dimensional XY model. Many quantum phase transitions , e. The liquidâ€”glass transition is observed in many polymers and other liquids that can be supercooled far below the melting point of the crystalline phase. This is atypical in several respects. It is not a transition between thermodynamic ground states: Glass is a quenched disorder state, and its entropy, density, and so on, depend on the thermal history. Therefore, the glass transition is primarily a dynamic phenomenon: Some theoretical methods predict an underlying phase transition in the hypothetical limit of infinitely long relaxation times. This continuous variation of the coexisting fractions with temperature raised interesting possibilities. On cooling, some liquids vitrify into a glass rather than transform to the equilibrium crystal phase. This happens if the cooling rate is faster than a critical cooling rate, and is attributed to the molecular motions becoming so slow that the molecules cannot rearrange into the crystal positions. Extending these ideas to first-order magnetic transitions being arrested at low temperatures, resulted in the observation of incomplete magnetic transitions, with two magnetic phases coexisting, down to the lowest temperature. First reported in the case of a ferromagnetic to anti-ferromagnetic transition, [12] such persistent phase coexistence has now been reported across a variety of first-order magnetic transitions. These include colossal-magnetoresistance manganite materials, [13] [14] magnetocaloric materials, [15] magnetic shape memory materials, [16] and other materials. The relative ease with which magnetic fields can be controlled, in contrast to pressure, raises the possibility that one can study the interplay between T_g and T_c in an exhaustive way. Phase coexistence across first-order magnetic transitions will then enable the resolution of outstanding issues in understanding glasses. Critical points[edit] In any system containing liquid and gaseous phases, there exists a special combination of pressure and temperature, known as the critical point , at which the transition between liquid and gas becomes a second-order transition. Near the critical point, the fluid is sufficiently hot and compressed that the distinction between the liquid and gaseous phases is almost non-existent. This is associated with the phenomenon of critical opalescence , a milky appearance of the liquid due to density fluctuations at all possible wavelengths including those of visible light. Symmetry[edit] Phase transitions often involve a symmetry breaking process. For instance, the cooling of a fluid into a crystalline solid breaks continuous translation symmetry: Typically, the high-temperature phase contains more symmetries than the low-temperature phase due to spontaneous symmetry breaking , with the exception of certain accidental symmetries e. An example of an order parameter is the net magnetization in a ferromagnetic system undergoing a phase transition. From a theoretical perspective, order parameters arise from symmetry breaking. When this happens, one needs to introduce one or more extra variables to describe the state of the system. For example, in the ferromagnetic phase, one must provide the net magnetization , whose direction was spontaneously chosen when the system cooled below the Curie point. However, note that order

parameters can also be defined for non-symmetry-breaking transitions. Some phase transitions, such as superconducting and ferromagnetic, can have order parameters for more than one degree of freedom. In such phases, the order parameter may take the form of a complex number, a vector, or even a tensor, the magnitude of which goes to zero at the phase transition. There also exist dual descriptions of phase transitions in terms of disorder parameters. These indicate the presence of line-like excitations such as vortex - or defect lines.

Relevance in cosmology[edit] Symmetry-breaking phase transitions play an important role in cosmology. It has been speculated by Lee Smolin and Benjamin and Jeremy Bernstein that, in the hot early universe , the vacuum i. As the universe expanded and cooled, the vacuum underwent a series of symmetry-breaking phase transitions. This transition is important to understanding the asymmetry between the amount of matter and antimatter in the present-day universe see electroweak baryogenesis. Progressive phase transitions in an expanding universe are implicated in the development of order in the universe, as is illustrated by the work of Eric Chaisson [20] and David Layzer.

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