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CYCLE DE FORMATION 2000/2001

et

SEMINAIRE ENERGIE ET ENVIRONNEMENT

Jakob RHYNER
ABB Corporate Research Center, Baden-Daettwill

sur

SUPERCONDUCTIVITY AND ENERGY

Jeudi 16 novembre 2000 à 17h.15

Auditoire – Bâtiment D - Battelle
7, route de Drize
1227 Carouge

PROGRAMME DES SEMINAIRES

Jeudi 30 novembre 2000 à 17h.30
Piles ou farces ? Quelle chance ont les piles à combustibles dans l'économie énergétique ? Léo Dubal, Ancien responsable du Programme Piles à Combustibles à l'Office fédéral de l'énergie, Berne.
Jeudi 21 décembre 2000 à 17h.15
Entre sécurité et justice, quelle gestion des déchets nucléaires ?, François Dermange, Institut romand d'éthique, Université de Genève, et Walter Wildi, Institut Forel, Université de Genève.
Jeudi 11 janvier 2001 à 17h.15
L'adéquation entre offre et demande d'électricité au niveau territoriale, Pascale Le Strat, INESTENE, Paris.
Jeudi 8 février 2001 à 17h.15
Le charbon et l'environnement dans les pays de l'Est - sortir du pire, Klaus Brendow, World Energy Council, Londres-Genève.
Date à fixer
Le marché et les prix du pétrole: passé, présent et futur, John Gault, John Gault SA, Vessy-Genève.

L'orateur

***Jakob Rhyner**, Leader of the Theoretical Physics group at the ABB Corporate Research Center, Baden-Dättwil. Main research areas are electric insulation technology and the application of high temperature superconductors in power systems. Co-author of the BfE-PSEL-ETHZ-EPFL-ABB system study « High Temperature Superconductivity in Power Systems » (March 2000).*

La conférence

Superconductivity has, since its discovery in 1911, generated hopes for a loss free, or at least very low loss, electric transmission and distribution system. One of the principal obstacles to its realization was the unavailability of an economic liquid Helium cooling system.

The discovery of high temperature superconductivity (HTSC) in 1986 gave the field a new impetus. In contrast to conventional superconductors, HTSC can be cooled with liquid nitrogen, which is by far less expensive than liquid helium. This has led to an intense worldwide effort to utilize HTSC for application in power systems, e.g. as transformers, cables, motors, fault current limiters, or energy storage devices. The main activities in the field will be shortly summarized.

Starting from a discussion of the relevant basic parameters of HTSC materials, their technical and economic potential for the use in power systems devices are assessed. Generally, it turns out that the bare « zero resistance » property of the superconductors is not sufficient for an economic application. Instead, superconductive devices are only attractive if they can provide additional functionalities, e.g. current limitation, magnetic levitation. It will be shown that different applications put very different requirements to the HTSC material. Most probably, the fault current limiter will be the first HTSC based product in power systems.

In order to systematically find opportunities for the introduction of HTSC, a detailed understanding of present power systems and its possible future developments is necessary. This is illustrated with a series of results from the recently completed BfE-PSEL-ETHZ-EPFL-ABB system study « High Temperature Superconductivity in Power Systems ».