The Abdus Salam
International Centre for Theoretical Physics

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2234-22

Meeting of Modern Science and School Physics: College for School Teachers of Physics in ICTP

27 April - 3 May, 2011

DIVERTISSEMENT of Fisicists around a glass of wine

Andrey Varlamov
SPIN-CNR
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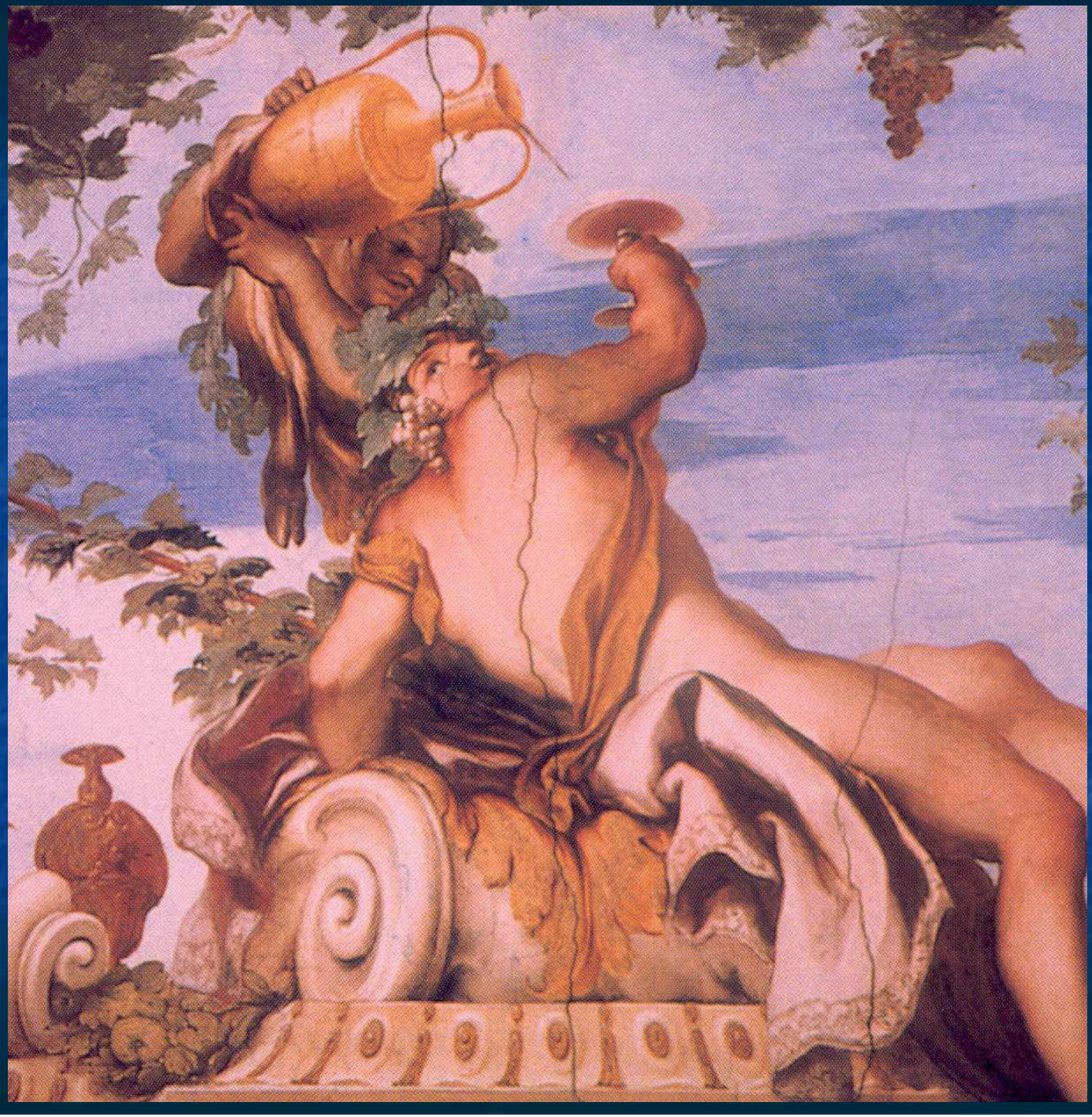
Italy

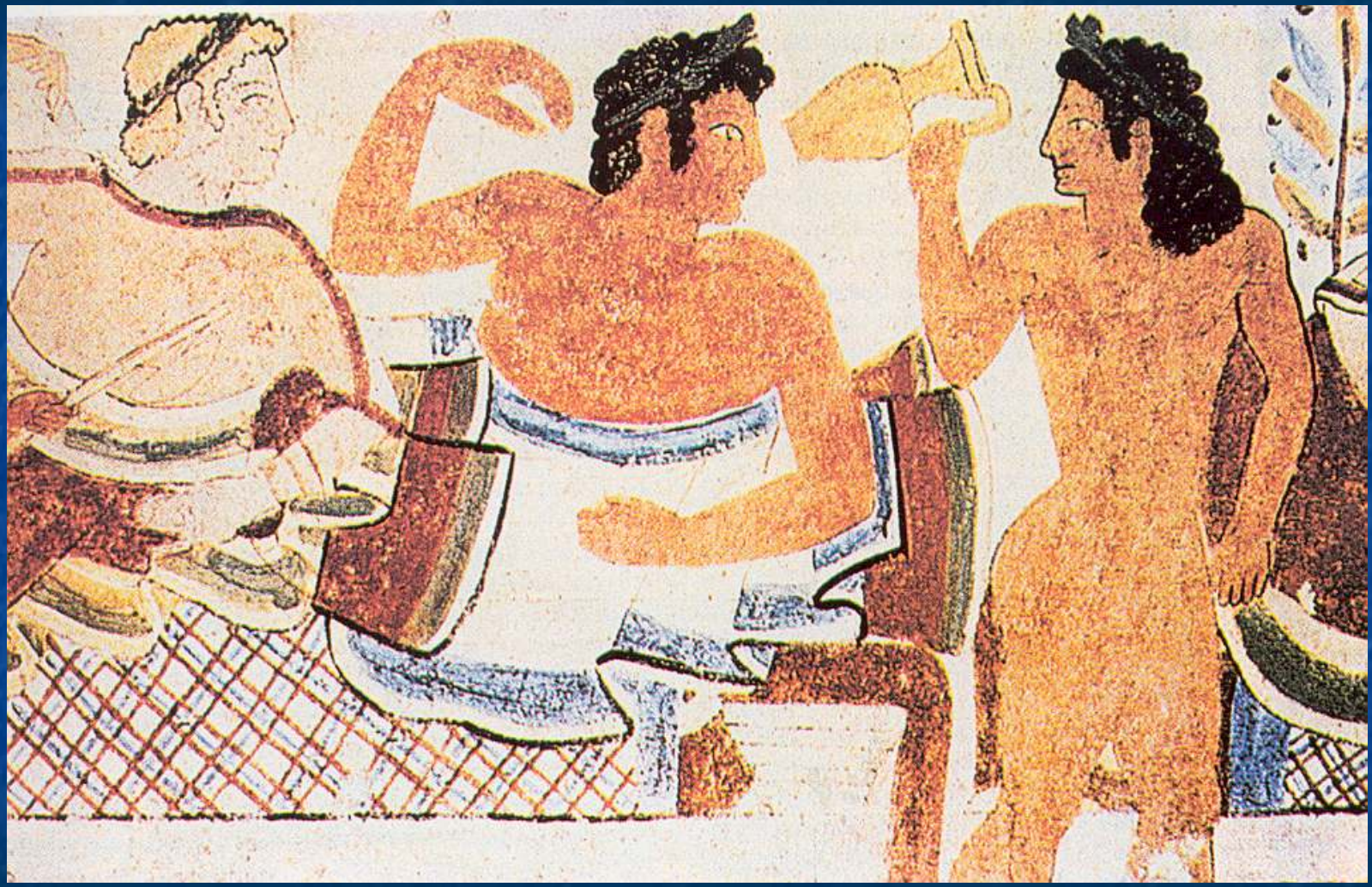
NUNC EST BIBENDUM:

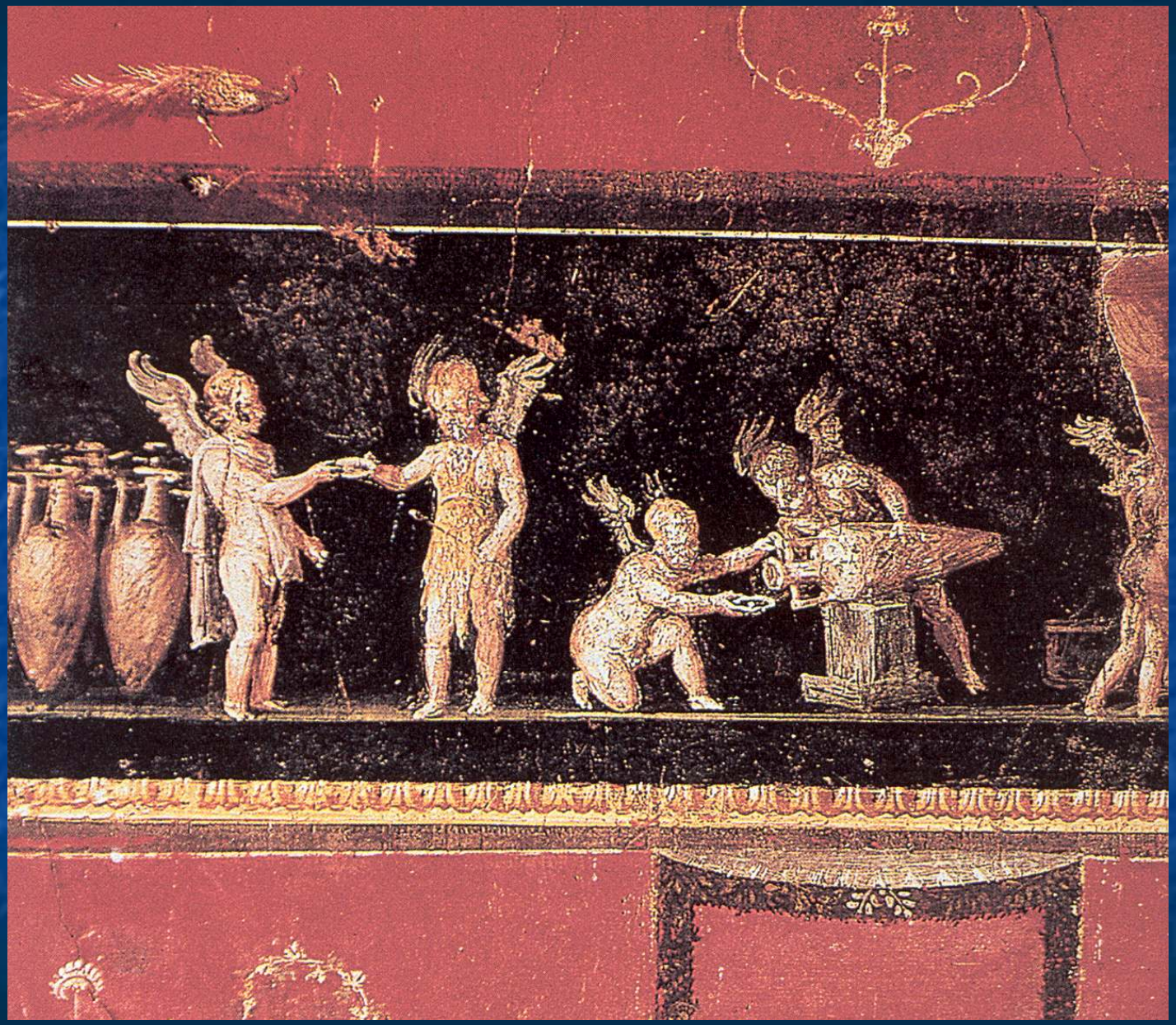
DIVERTISSEMENT of Fisicists around a glass of wine

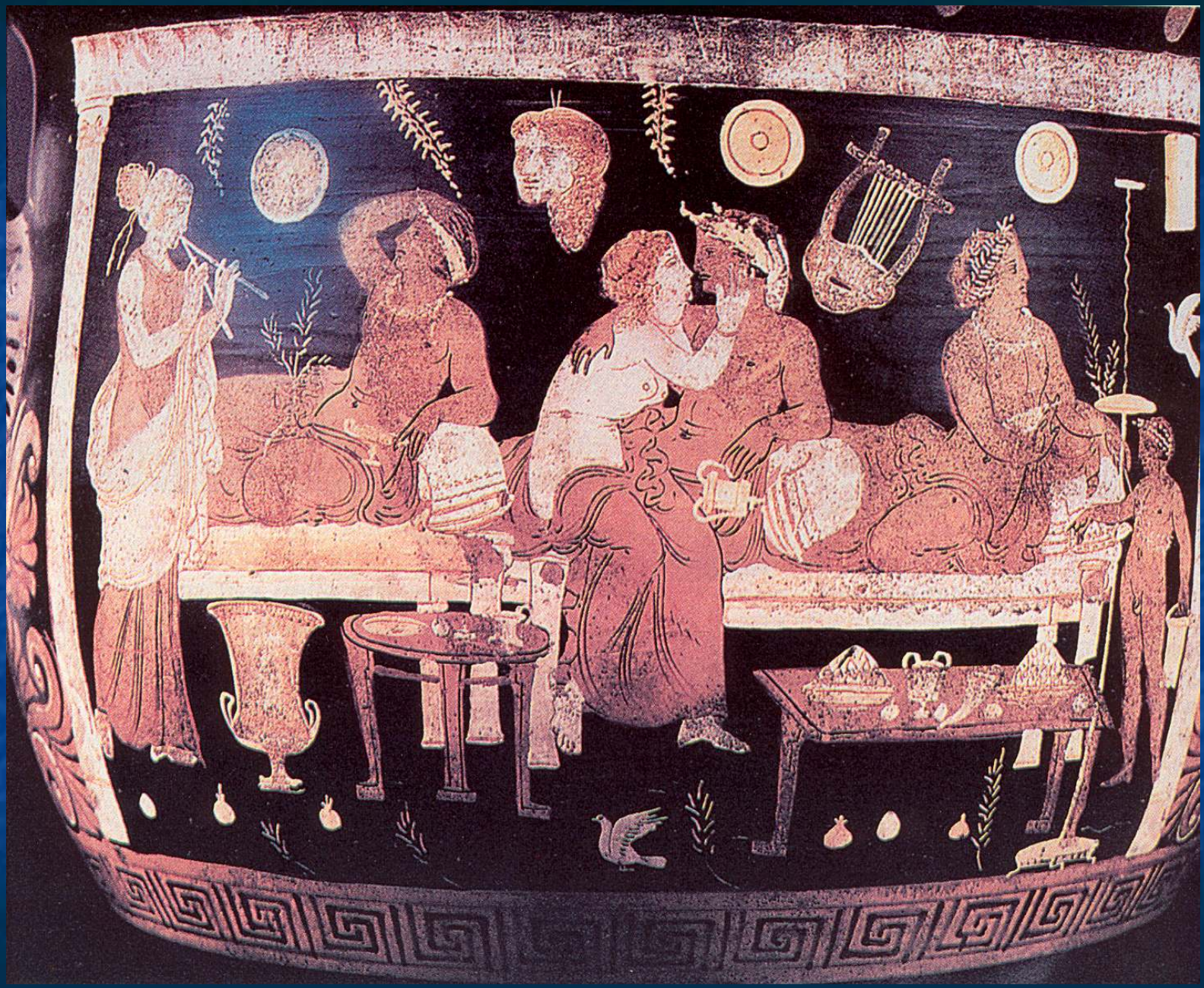
Andrey Varlamov,
SPIN-CNR, Italy

In collaboration with
A. BOUZDINE, University of Bordeaux,
A. RIGAMONTI, Università di Pavia



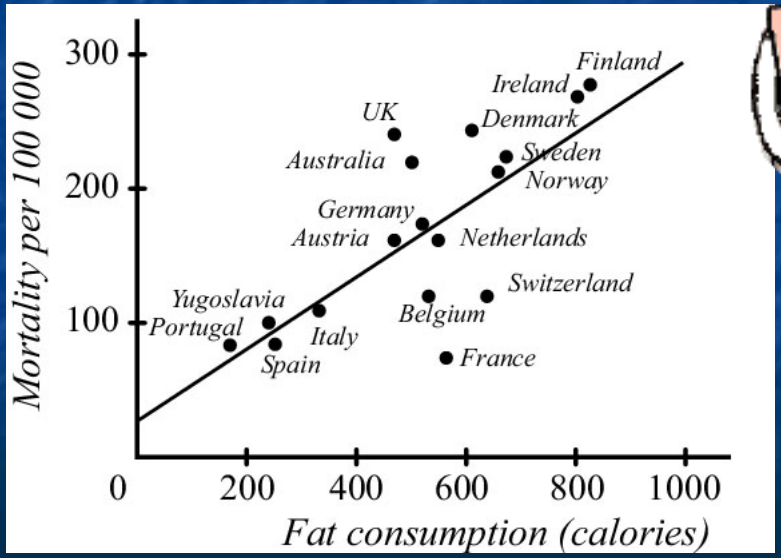






Bordeaux paradox

Wine and Infarct



$$I = I_0 e^{-(b/b_i)},$$

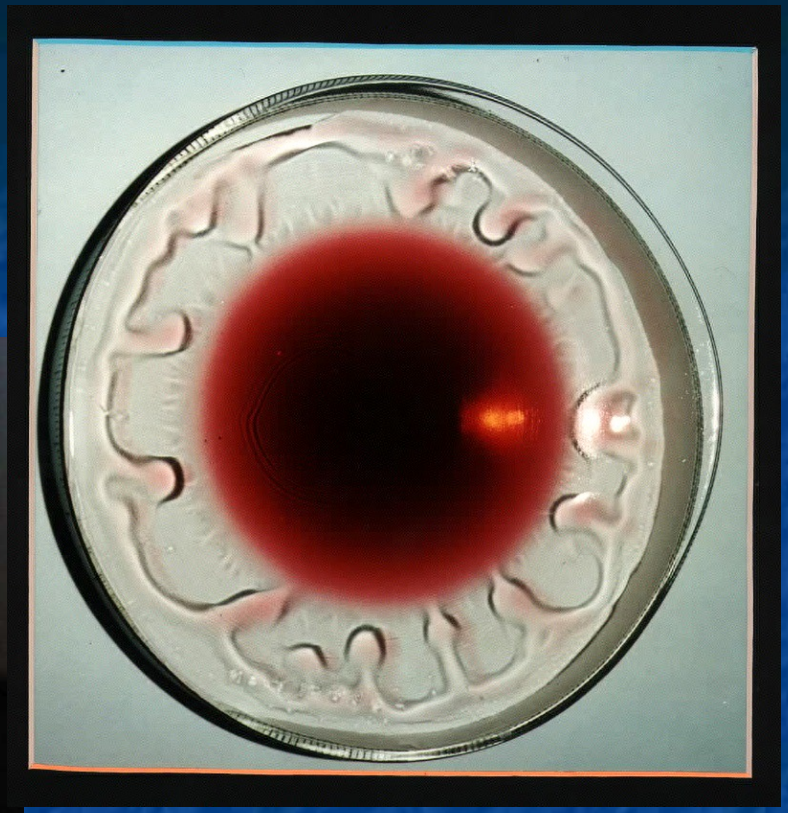
$$C = C_0 e^{(b/b_c)},$$

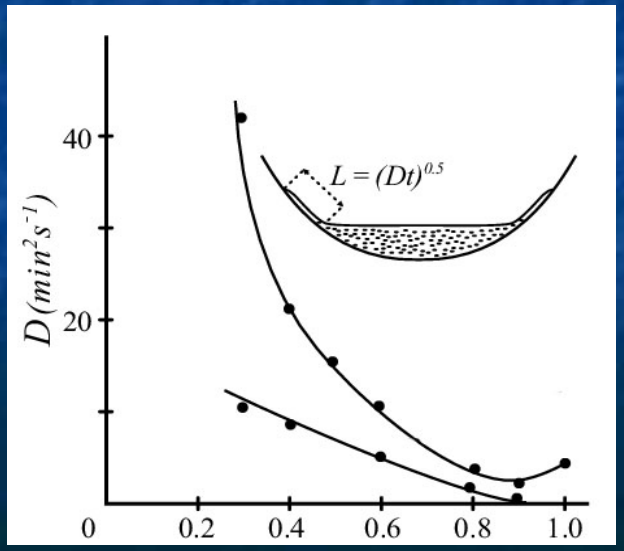
$$b^* = \frac{b_i b_c}{b_i + b_c} \cdot \left(\ln \frac{b_c}{b_i} + \ln \frac{I_0}{C_0} \right).$$

Bevande alcoliche: se sì, solo in quantità controllata

Un consumo moderato (1 bicchiere di vino da 11-12 gradi durante i due pasti principali) può essere ammesso, se non sono presenti controindicazioni (epatopatie, dislipidemie, obesità, interferenze farmacologiche)

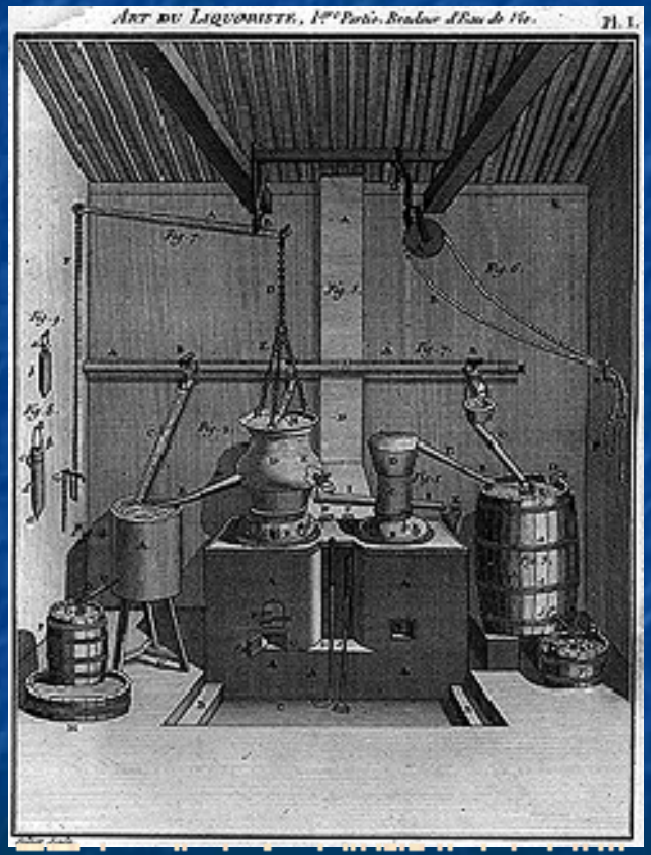
Wine tears



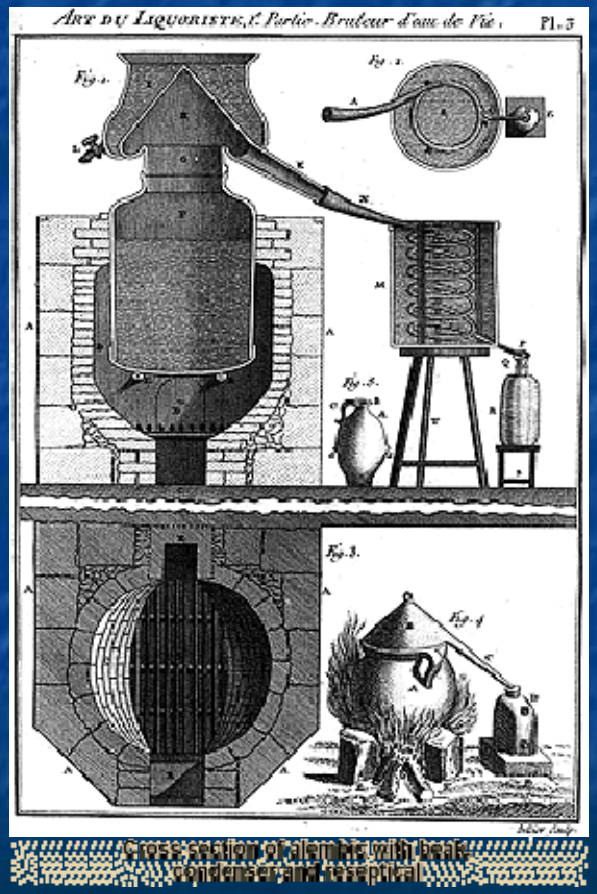


Marangoni effect

Why vodka has a proof around 40%?



Early Distillery

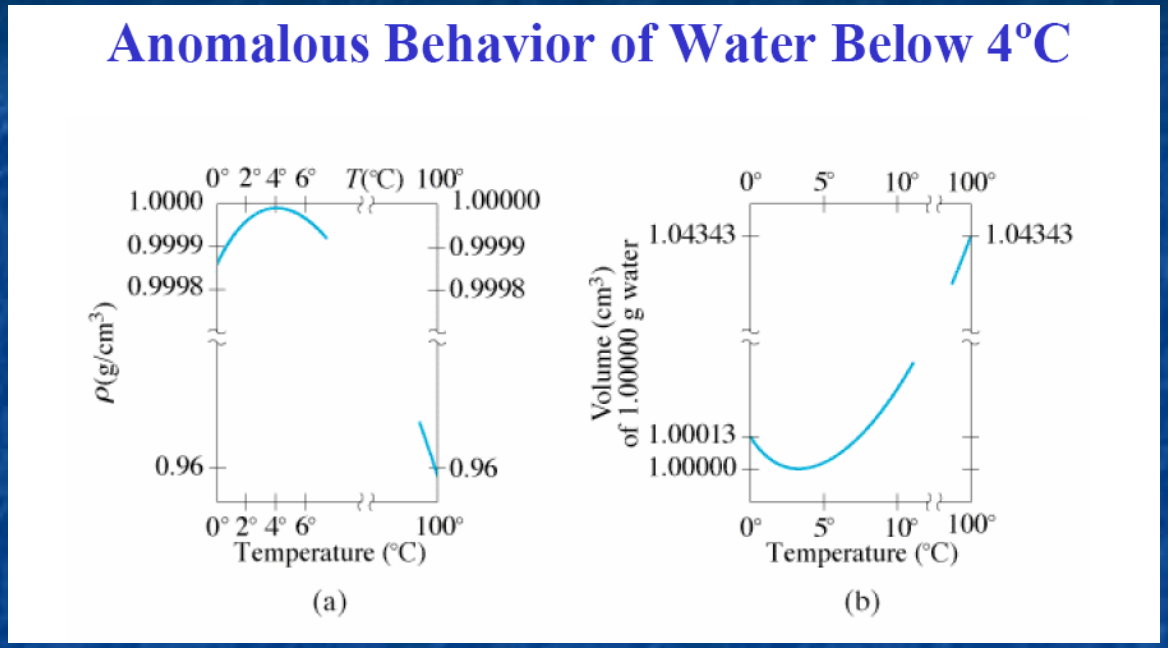


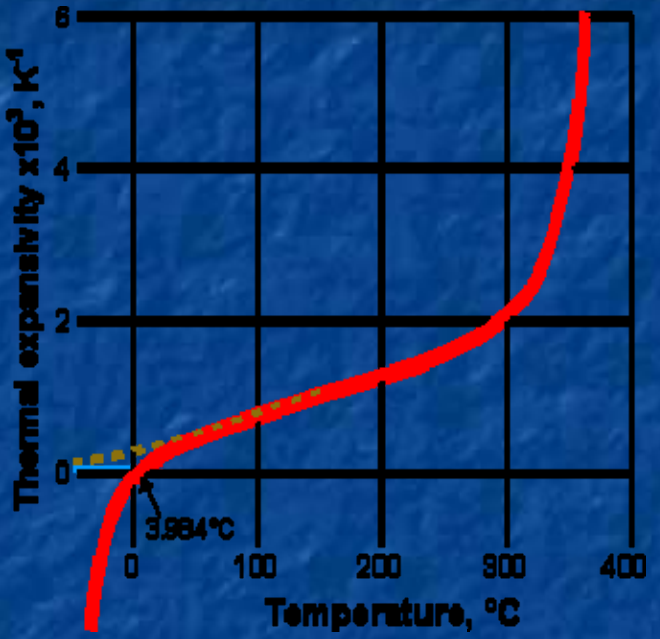
Cross-section of alembic with beak, condenser and receptical

a). The law of Ivan the Terribile

b). The law of Mendeleev

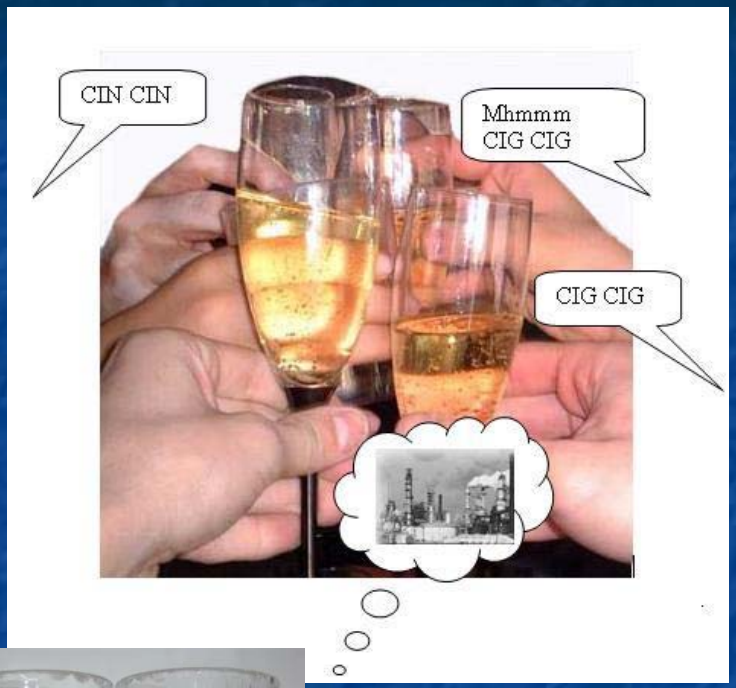
c). Absence of thermic expansion





$$0.6\,\alpha_{H_2O} + 0.4\,\alpha_{C_2H_5OH} = 0$$

Bubbles, avalanches and “perlage” of champagne

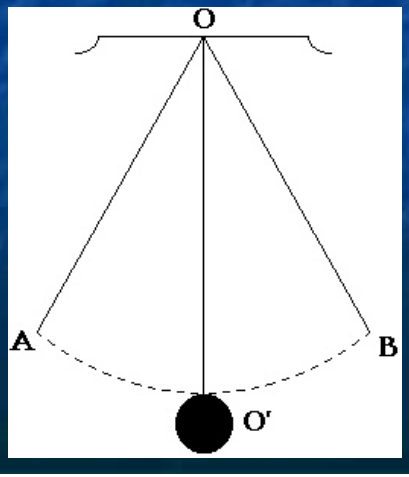


$$P_e\,(x,\,t) = P_0\,\cos\left(\frac{2\pi\,x}{\lambda} - \omega\,t\right),$$

$$P_e\,(t) = P_{\rm atm} + P_0\,\cos\omega\,t.$$

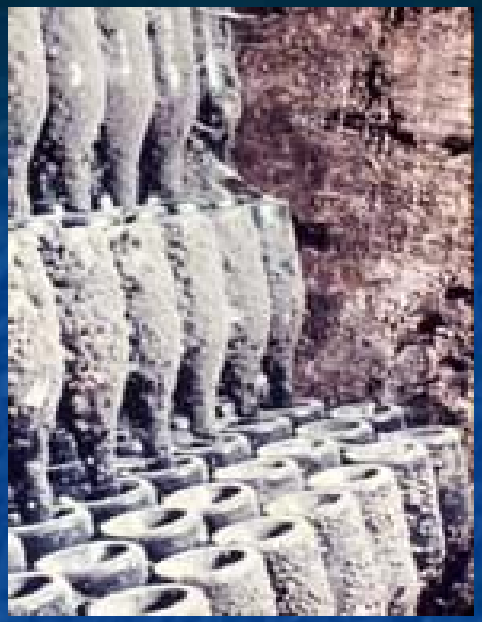
$$\nu_2 \sim \sqrt{\frac{k_2}{m}} \sim \frac{P_0^{\frac{1}{2}}}{\rho^{\frac{1}{2}}\,r_0}.$$

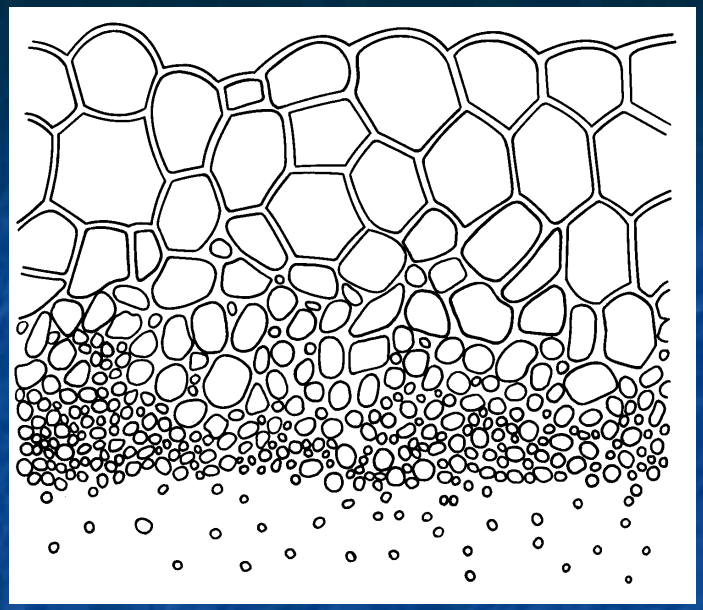
$\sigma = 0.07\,N/m,\ P_0 = 10^5\,Pa,\ \rho = 10^3\,kg/m^3$



$$r_1 \sim \frac{\sigma^{\frac{1}{3}}}{\rho^{\frac{1}{3}}\,\nu_0^{\frac{2}{3}}} = 0.05\,mm;$$

$$r_2 \sim \frac{P_0^{\frac{1}{2}}}{\rho^{\frac{1}{2}}\,\nu_0} = 0.3\,mm.$$



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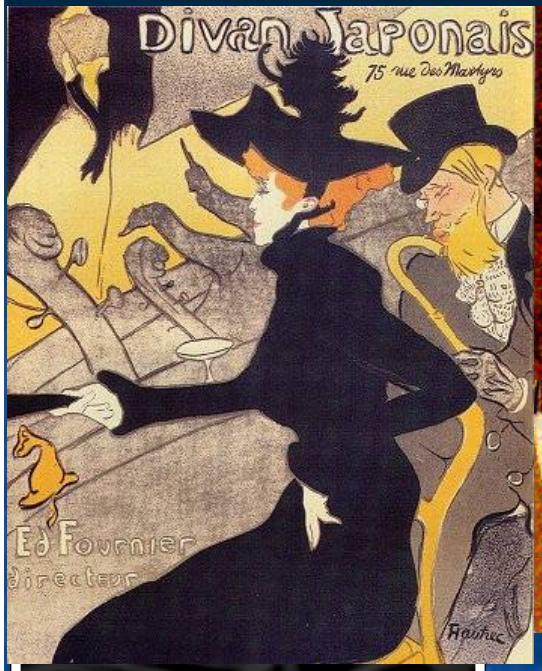
Pastis



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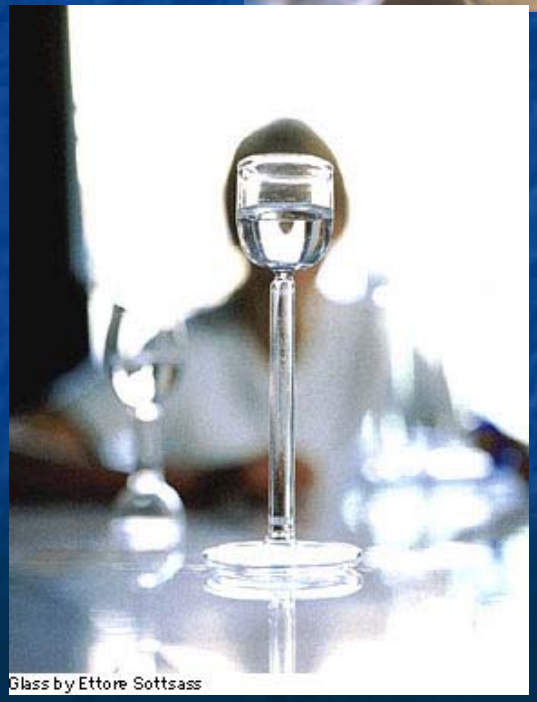
Glass by Ettore Sottsass

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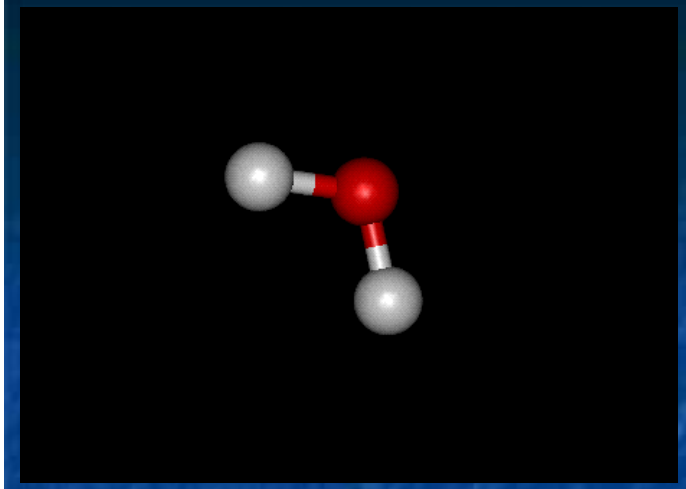
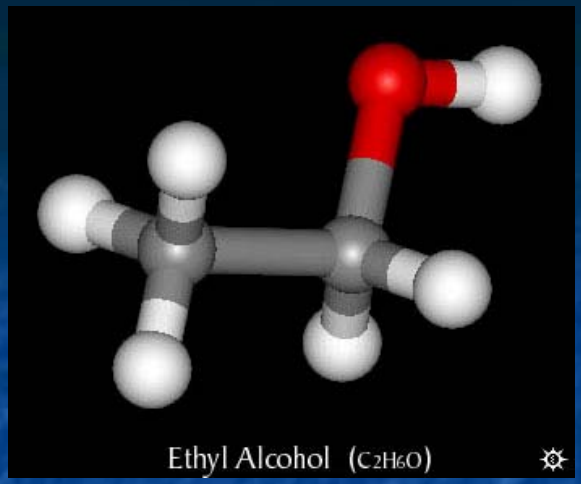
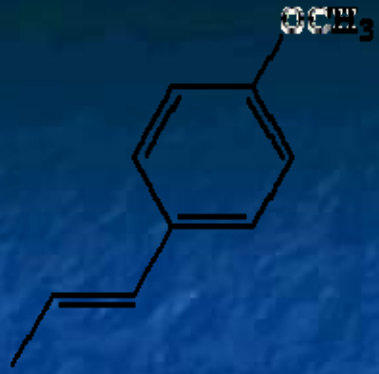
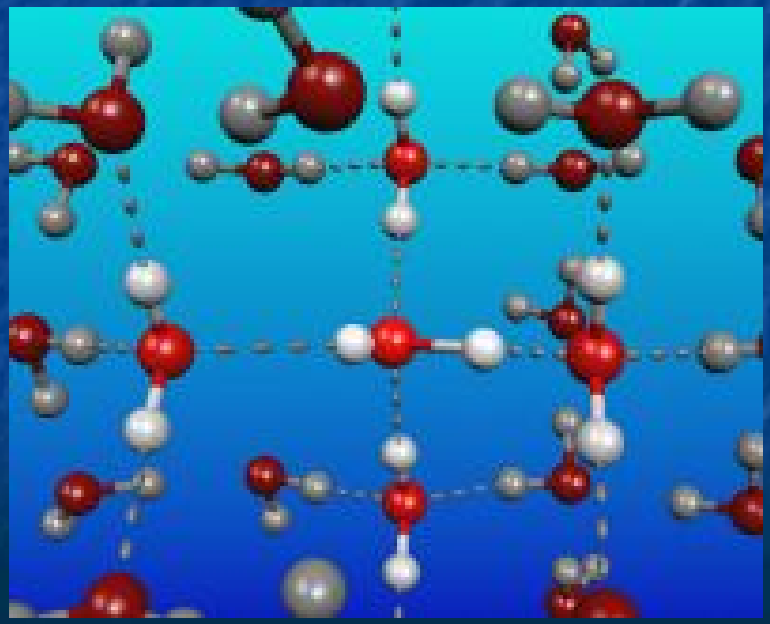


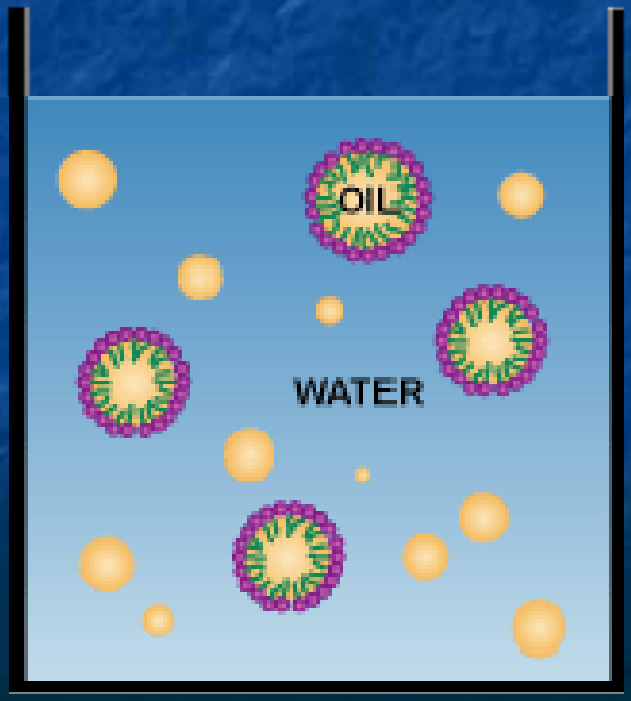


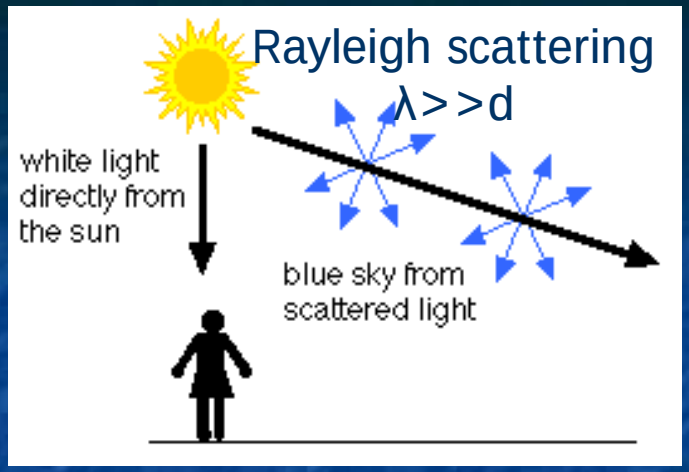


Water



Emulsion




Rayleigh scattering
λ>>d
white light
directly from
the sun
blue sky from
scattered light


Mie scattering
λ<<d


Cortona belvedere

5. Nuclear magnetic resonance: SNIF-NMR method

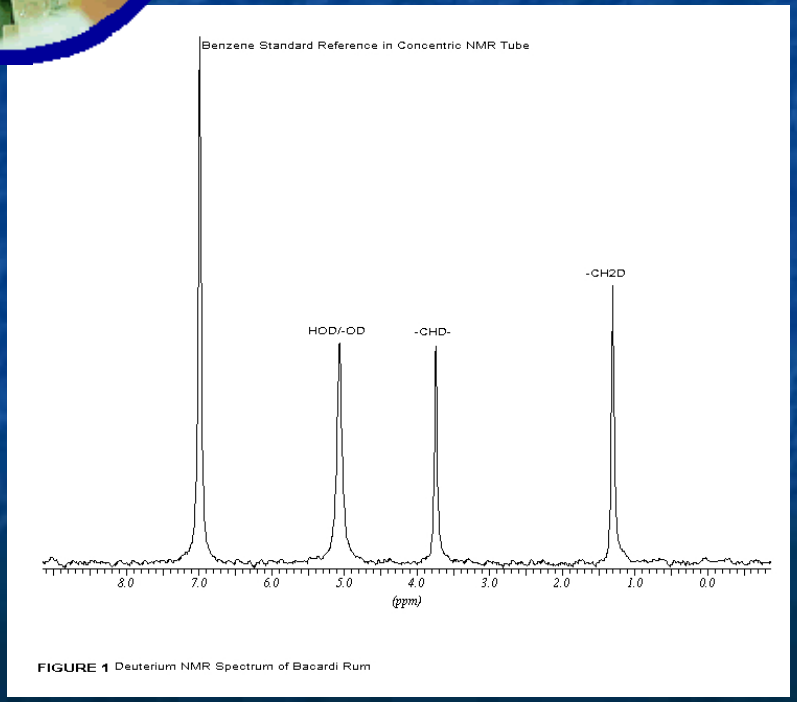


FIGURE 1 Deuterium NMR Spectrum of Bacardi Rum

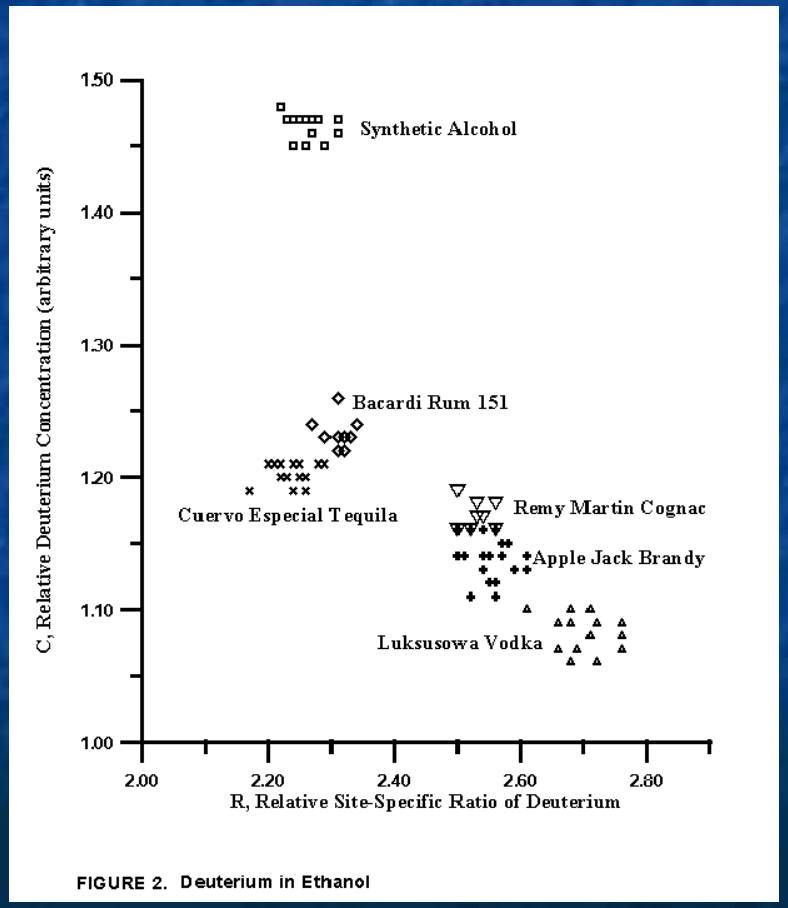


FIGURE 2. Deuterium in Ethanol

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AA Abrikosov, 2003 Nobel Prize Winner

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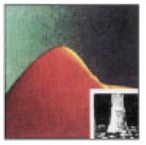

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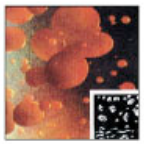

L G Aslamazov • A A Varlamov