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Innovation

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What is Article Evolution?

articleevolution

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New article HTML page

The screenshot shows the HTML page for the article "Atomic and electronic structure of ultrathin fluoride barrier layers at the oxide/Si interface" in the Journal of Physics: Condensed Matter. The page includes a navigation bar, a sidebar with social media and citation options, a main content area with an abstract and introduction, and a right sidebar with a table of contents and related articles. Red boxes and arrows highlight specific features: "MathJax" in the top right, a social media and sharing menu, a "Contents" sidebar, a "Share" button, and a "BibTeX format (bib)" dropdown menu.

MathJax

Navigation

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MathJax

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Figure tools

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References | **Browse figures**

From the intensity ratio of the interface and bulk Si 2p components, Si_{int} and Si_{bulk} , it is possible to evaluate the thickness of the intermixed region [36]. The intensities of the two components are obtained from the fitting of the experimental spectra with Voigt peaks (inset of figure 1 (a)), centred at 99.5 eV (Bulk-FWHM 1.5 eV) and at 102.5 eV (Int.-FWHM 2.0 eV). Assuming that the buried reacted interface is uniform and using the calculated inelastic mean free path (IMFP) values [25] of Si and SiO_2 for the substrate and the interface layer, respectively, the thickness of this intermixed region is estimated to be about 9 Å. Applying calculated IMFPs for a Yb silicate interface layer does not alter this estimate appreciably. It should be noted that, in general, thicker interface reacted layers (1–5 nm) were suggested for Yb_2O_3 films prepared by the ALD method [11] and by reactive sputtering [32, 33].

Figure 5. 2D He diffraction patterns spanning (a) growth regime IV (0.72 ML coverage) and (b) growth regime V (1.75 ML coverage), both collected at $\theta_i = 58.2^\circ$. The color map is logarithmic. The unit cells, corresponding to the two possible surface domains of $(3 \times 3)R12.5^\circ$ symmetry, are represented by the solid lines in (a). In (b), the lower portion is experimental data, whilst the upper portion derives from a simulation, as discussed in the text.

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Krastanov growth mode for SrF_2 can thus be assumed. It should be noted however, that due to high rate of molecular re-evaporation from the surface when this is held at $700\text{--}750^\circ\text{C}$ during growth, the density of the SrF_2 islands does not increase rapidly, even after prolonged deposition times. The surface continues to expose large portions of the uncovered, reacted wetting layer.

Data presented in figure 2 correspond to a single layer of SrF_2 deposited on clean Si held at 700°C . The F 1s and Sr 3d photoemission signals shown in figures 2(a) and (b) indicate the formation of the wetting layer. It can be noticed that the peak positions on the interface layer are shifted to lower BE with respect to the bulk SrF_2 values (also shown for comparison in figures 2(a) and (b)). In particular, the BE of the F 1s core level is shifted from 685.9 ± 0.2 (bulk) to 684 ± 0.2 eV (int.), as for the case of $CaF_2/Si(100)$ [16]. Concerning Sr 3d, a unique doublet corresponding to the $1.8\text{ eV } 3d_{5/2}\text{--}3d_{3/2}$ spin-orbit split components is observed for the interface layer, with maximum of the Sr $3d_{5/2}$ peak at 134.5 ± 0.2 eV. This is shifted by about 1.5 eV with respect to the bulk level and it is ascribed both to initial and final state effects in the photoemission process [19]. The observed shifts can be considered as the evidence of the formation of the reacted wetting layer, with the dissociation of the SrF_2 molecules and with the Sr atoms bonding to the substrate Si to form Si–Sr–F species.

a) 600 | — Si/SrF₂ int. b) 600 | — Si/SrF₂ int.

Full size images,
not thumbnails

Zoom in

Export to
PowerPoint

Tabs for images, references and citations

The screenshot shows the IOPscience website interface for the journal 'Journal of Physics: Condensed Matter'. The page features a navigation bar with options like 'Home', 'Search', 'Collections', 'Journals', 'About', 'Contact us', and 'My IOPscience'. A search bar is located at the top right. The main content area is divided into several sections:

- Journal Information:** 'Journal of Physics: Condensed Matter > Volume 23 > Number 35'.
- MathJax:** A toggle switch for 'MathJax' is set to 'On'.
- Navigation Tabs:** On the left side, there are three tabs: 'Browse figures', 'References', and 'Citations'. The 'Browse figures' tab is currently active, displaying a grid of thumbnail images from the article.
- Abstract:** A paragraph of text starting with 'A SrF₂ ultrathin barrier layer on Si(001) is used to form a sharp interface and block reactivity and intermixing between the semiconductor and a Yb₂O₃ overlayer...'.
- 1. Introduction:** A section of text starting with 'The formation of interfaces between ultrathin oxide films with novel physical properties and silicon has recently attracted considerable interest...'.
- Export Options:** A dropdown menu for 'BibTeX format (bib)' and a button for 'Export citation and abstract'.
- Right Sidebar:** Contains a 'Contents' section with a list of article sections (1. Introduction, 2. Experimental details, 3. Results and discussion, 3.1. Photoemission, 3.1.1. Yb₂O₃/Si(100), 3.1.2. Yb₂O₃/SrF₂/Si(100), 3.1.3. Valence band, 3.2. X-ray absorption fine structure, 4. Conclusions), and sections for 'Users also read', 'Related review articles', and 'Journal links'.

Browse images, references and citations in tabs

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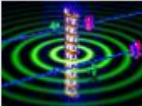

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 **Experimental observation of time-delays associated with electric Matteucci–Pozzi phase shifts** 

Shawn A Hilbert, Adam Caprez and Herman Batelaan
2011 *New J. Phys.* **13** 093025
[doi:10.1088/1367-2630/13/9/093025](#)

 **Graphene, universality of the quantum Hall effect and redefinition of the SI system** 

T J B M Janssen, N E Fletcher, R Goebel, J M Williams, A Tzalenchuk, R Yakimova, S Kubatkin, S Lara-Avila and V I Falko
2011 *New J. Phys.* **13** 093026
[doi:10.1088/1367-2630/13/9/093026](#)

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Additional information on the article page

New Journal of Physics > Volume 13 > July 2011

Adaptive-network models of swarm dynamics

Cristián Huepe^{1,3}, Gerd Zschaler², Anne-Ly Do² and Thilo Gross²
[Show affiliations](#)

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- 3. Analytical description
- 4. Results
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Abstract

We propose a simple adaptive-network model describing recent swarming experiments. Exploiting an analogy with human decision making, we capture the dynamics of the model using a low-dimensional system of equations permitting analytical investigation. We find that the model reproduces several characteristic features of swarms, including spontaneous symmetry breaking, noise- and density-driven order-disorder transitions that can be of first or second order, and intermittency. Reproducing these experimental observations using a non-spatial model suggests that spatial geometry may have less of an impact on collective motion than previously thought.



00:00 04:01

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GENERAL SCIENTIFIC SUMMARY

Introduction and background. To understand how groups of self-propelled individuals (such as bird flocks, fish schools or insect swarms) make collective decisions, simple, low-dimensional descriptions of population-level behaviour are highly desirable. In closely related research on human decision making, analytically tractable modelling approaches based on network theory are used.

Main results. We introduce a simple adaptive-network model describing swarming experiments by Buhl *et al* (2006 *Science* 312 1402–6), where groups of locusts march freely in a ring-shaped arena. At low insect densities, no ordered collective motion is observed, whereas at high insect densities a common persistent marching direction emerges. Our model captures these two regimes and identifies the swarming transition as a (subcritical or supercritical) pitchfork bifurcation. It

Video abstracts

General Scientific Summaries



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IOP PUBLISHING JOURNAL OF BREATH RESEARCH

J. Breath Res. **5** (2011) 046001 (7pp) doi:10.1088/1752-7155/5/4/046001

A new¹³C breath test to detect vitamin B12 deficiency: a prevalent and poorly diagnosed health problem

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Abstract **vitamin B12 deficiency** is emerging as a growing public health problem. The most commonly used diagnostic tests are limited in accuracy, sensitivity, and are non-specific for **B12 deficiency**. The aim of this study was to develop a **simple B12 breath test** (BBT) to more accurately evaluate vitamin B12 status as an alternative to the most common **diagnostic test**, serum **B12** levels. The **breath test** is based on the metabolism of sodium 1-¹³C-propionate to ¹³

CO₂ which requires B12 as a cofactor. We initially compared the BBT to current B12 diagnostic methods in 58 subjects. Subjects also received a second BBT 1–3 days after initial testing to evaluate reproducibility of results. Propionate dosage, fasting times, and collection periods were compared, respectively. The dose of **sodium 1-¹³C-propionate** (10–50 mg) gave equivalent results while an 8 h fast was essential. Statistical analysis revealed that breath collection times could be reduced to just a baseline and 10 and 20 min following propionate dosing. We also measured the incidence of **B12 deficiency with the BBT in 119 patients with chronic pancreatitis, Crohn's disease, small intestinal bacterial overgrowth, and subjects over 65 years of age**. The BBT may provide a **diagnostic test to detect vitamin B12 deficiency**.

(Some figures in this article are in colour only in the electronic version.)

Introduction

Vitamin B12 (cobalamin) deficiency is emerging as a common clinically important problem. The 3000 person Framingham study indicated that almost 40% of these generally healthy adults had **low serum B12 levels**, < 258 nmol l⁻¹ (11). **Cobalamin levels** at 258 nmol l⁻¹ or lower

Treatment Terms(68)
Living Being Terms(60)
Diagnostic Terms(41)
Cell And Tissue Terms(10)
Symptom Terms(5)

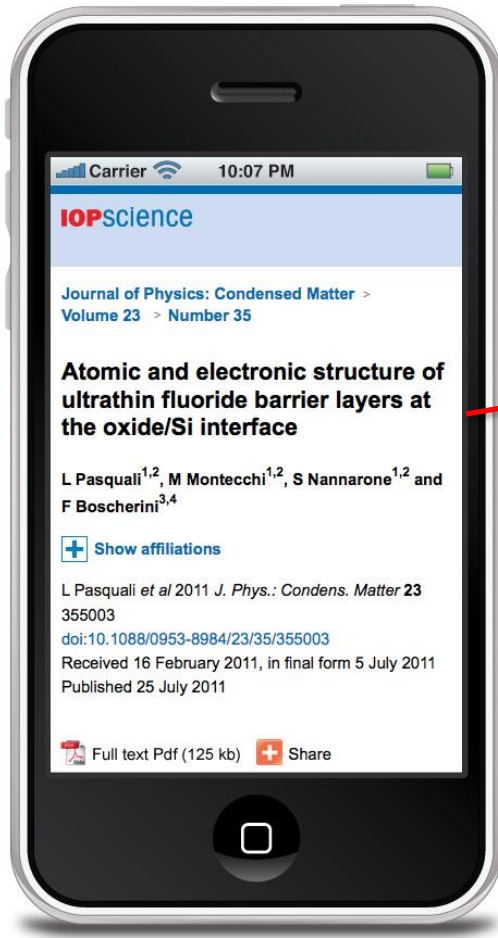
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