# Article information:

Can We See Real Atoms and Molecules? Electron Microscopy at a Glance - Chemistry Hall  
<https://chemistryhall.com/can-we-see-real-atoms-and-molecules-electron-microscopy/>

# Article summary:

1. Chemists have long struggled to characterize molecular compounds and confirm their structures.

2. Atomic force microscopy (AFM) allows for high-resolution imaging of molecules and atoms, including the observation of chemical reactions.

3. Micro-electron diffraction (MicroED) is a promising technique that allows for the determination of 3D structures of non-crystalline solids with high resolution.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article "Can We See Real Atoms and Molecules? Electron Microscopy at a Glance" provides an overview of the current state of atomic microscopy and its potential to revolutionize the field of chemistry. The author acknowledges the limitations of traditional methods for characterizing molecular compounds, such as NMR spectroscopy and single-crystal X-ray diffraction, which can be difficult to interpret even for trained chemists.

The article then introduces atomic force microscopy (AFM) as a high-resolution probe-microscopy technique that allows scientists to directly visualize molecules at the nanometer scale. The author cites several examples of AFM being used to observe real molecules, including the first cyclic allotrope of carbon and the direct imaging of molecular structures during chemical reactions.

While the article provides interesting insights into the potential of atomic microscopy, it is important to note that there are limitations to this technique as well. The author briefly mentions that only near-planar molecules can be analyzed using AFM, which limits its applicability to certain types of compounds. Additionally, while AFM has been used to directly observe chemical reactions, it is unclear how widely applicable this technique will be in practice.

Furthermore, the article does not provide a balanced view of traditional methods for characterizing molecular compounds. While NMR spectroscopy and single-crystal X-ray diffraction may have limitations, they are still widely used in chemistry research and have contributed significantly to our understanding of molecular structures.

Overall, while the article provides interesting insights into atomic microscopy and its potential applications in chemistry research, it would benefit from a more balanced discussion of both its strengths and limitations compared to traditional methods.

# Topics for further research:

* Limitations of atomic force microscopy in analyzing non-planar molecules
* Comparison of atomic force microscopy with traditional methods for characterizing molecular compounds
* Applications of NMR spectroscopy in chemistry research
* Advantages and disadvantages of single-crystal X-ray diffraction
* Challenges in directly observing chemical reactions using atomic force microscopy
* Future developments in high-resolution probe-microscopy techniques for molecular analysis

# Report location:

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