

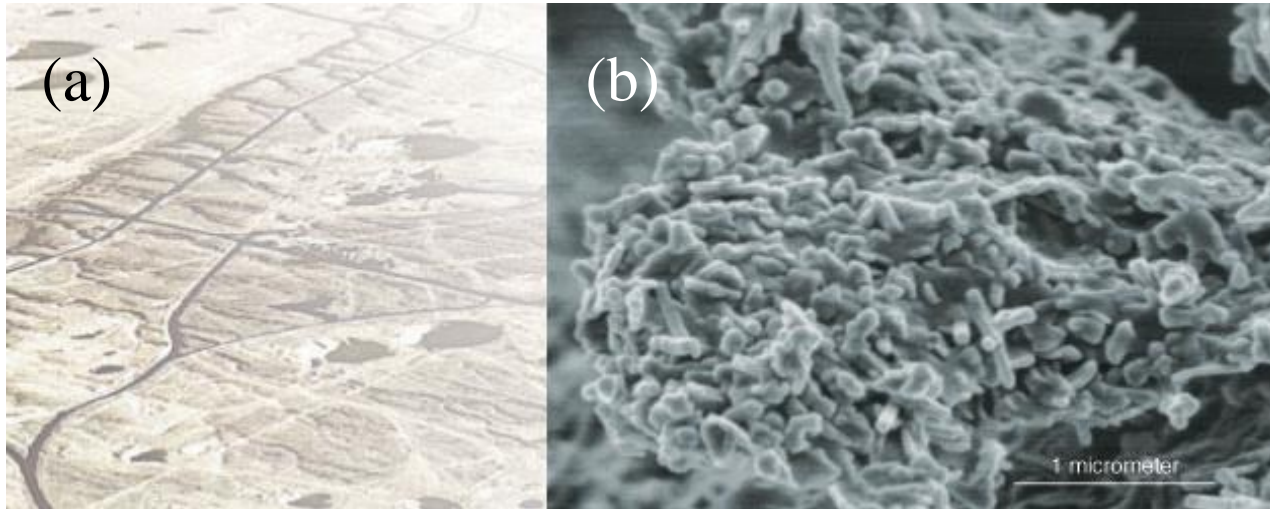
# Effective Figure Captions for Technical Documents

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Conceptual drawing of the Macondo well, blowout preventer, and broken piping after the BP well exploded on April 20, 2010, and the Deepwater Horizon drilling rig sank. Rendering by Sabrina Fletcher. *Courtesy Lawrence Livermore National Laboratory.*

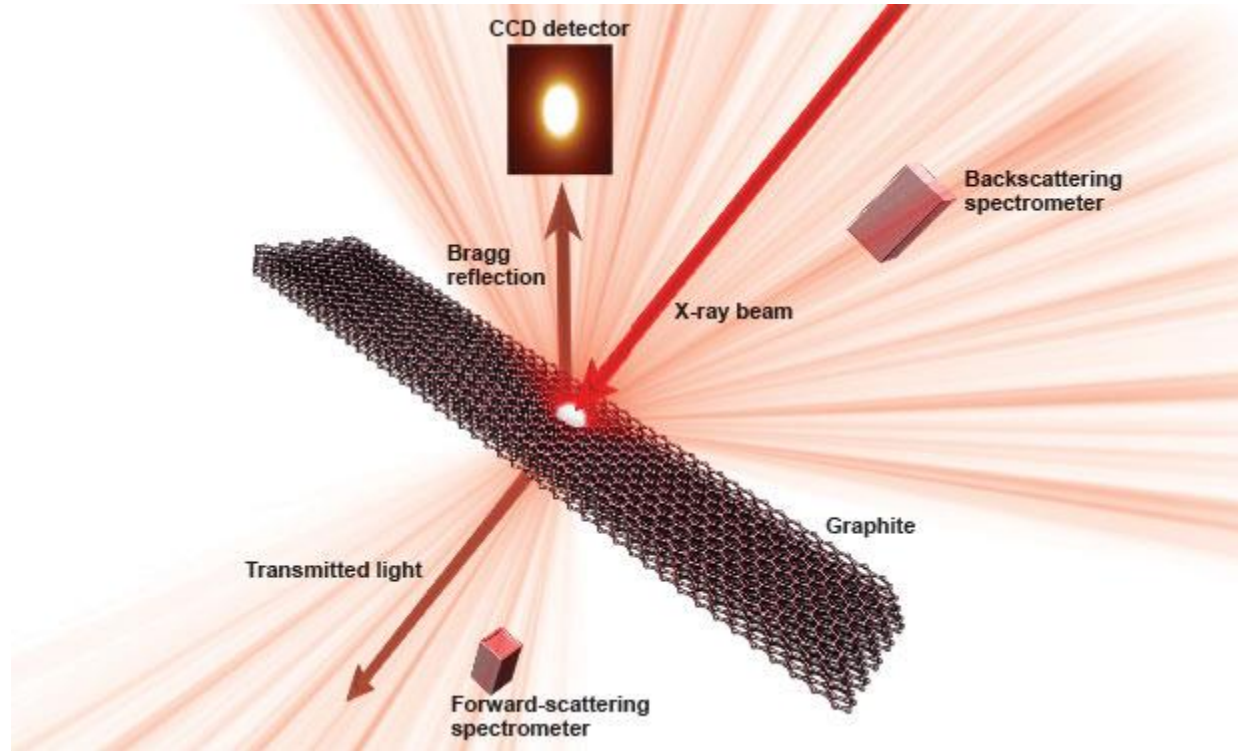
With thanks to S. Lance Cooper for the examples shown in Slides 13–15 and to Tony Liss for helpful suggestions.

**Figure captions are placed *below* the figure and aligned according to the journal's style**



**Figure 1. (a) Aerial view of the Nevada National Security Site; (b) transmission electron microscope image of Pu-contaminated groundwater. Colloids have been shown to play a significant role in transporting Pu at contaminated sites worldwide. [1]**

# Describe all elements of the figure without referring to material in the text



**Figure 2. Experimental setup to measure breakdown of solid-crystal graphite. A charge-coupled device (CCD) detector simultaneously collects Bragg-reflected x-ray laser light as crystal x-ray spectrometers collect light from inelastically scattered photons, enabling observation of extremely fast changes in graphite “melting.” [1]**

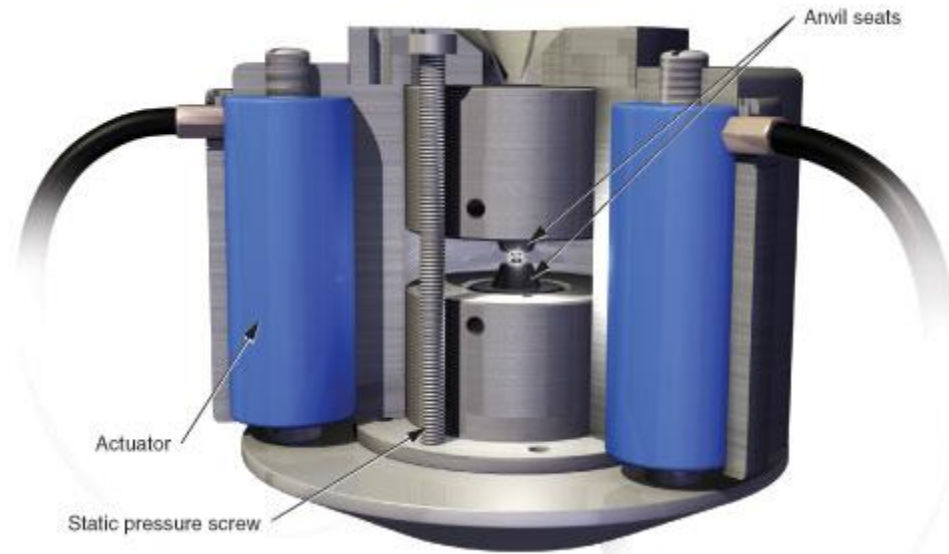
# What's wrong with this caption?



**Figure 4. An image sequence from a dDAC experiment shows the growth of a dendritic ice-VI crystal in response to increasing compression. [1]**

- **dDAC not defined (caption must “stand alone”)**
- **sample material not specified**
- **pressure range and the elapsed time not specified**
- **black “spots” in each image not identified**
- **label pointing out the “crystal” would be helpful**
- **“micrometers” should be “ $\mu\text{m}$ ”**

**If a figure is taken from another source,  
it should be referenced in the caption**



**Figure 3. Drawing of a dynamic diamond-anvil cell (dDAC). As diamond anvils compress micrometer-size samples, the piezoelectric actuator varies the static pressure, allowing researchers to examine how compression rates affect materials' behavior. [1]**

**If a figure is taken from another source,  
it should be referenced in the caption**

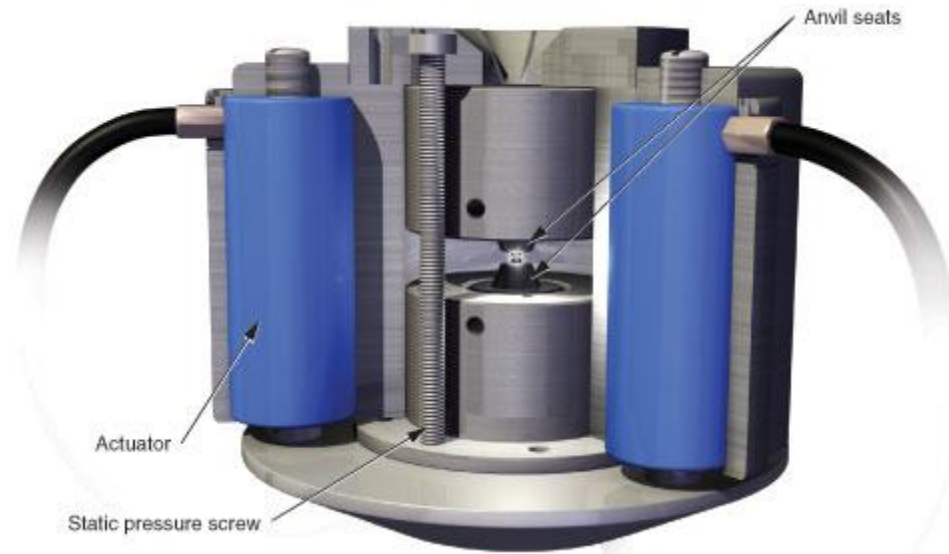
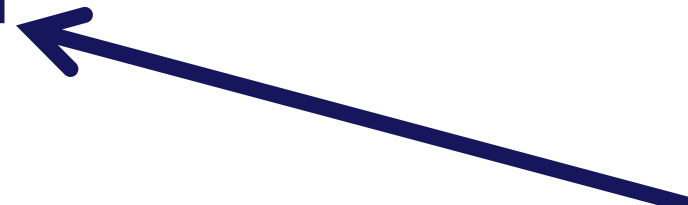
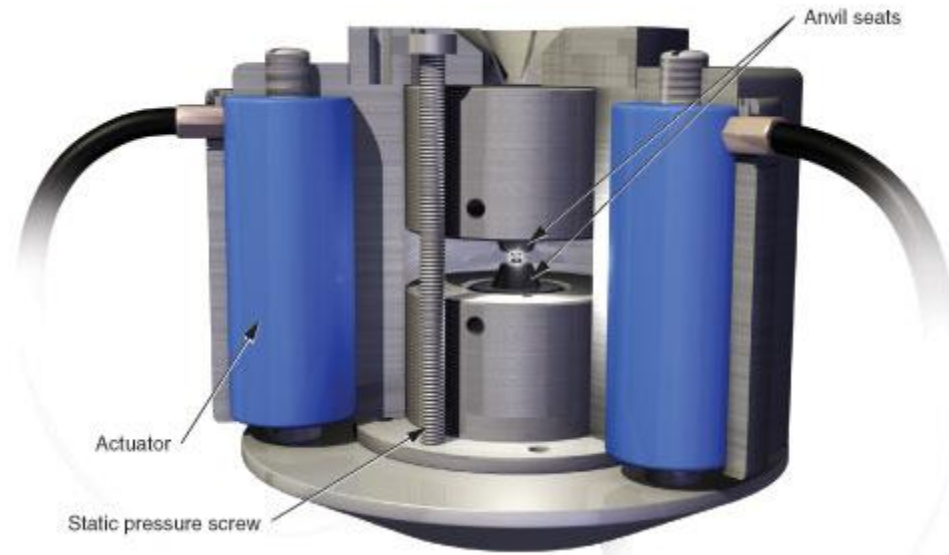


Figure 3. Drawing of a dynamic diamond-anvil cell (dDAC). As diamond anvils compress micrometer-size samples, the piezoelectric actuator varies the static pressure, allowing researchers to examine how compression rates affect materials' behavior. [1]

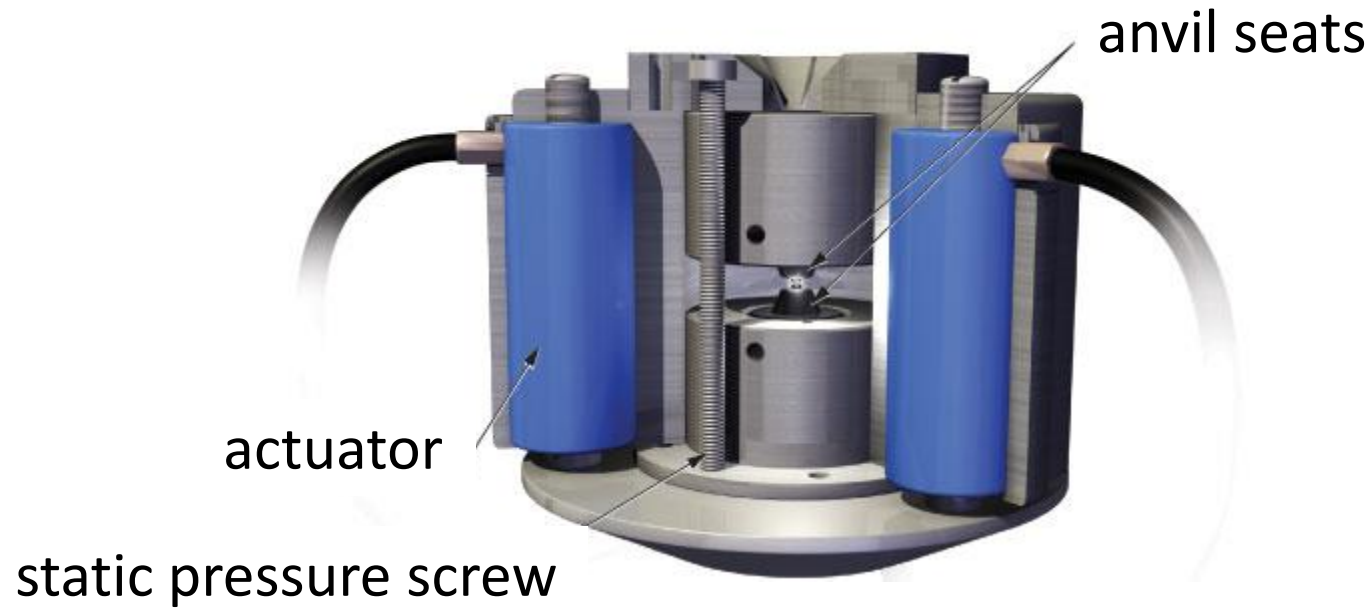


**Make sure the labels are big enough to be read**



**These aren't.**

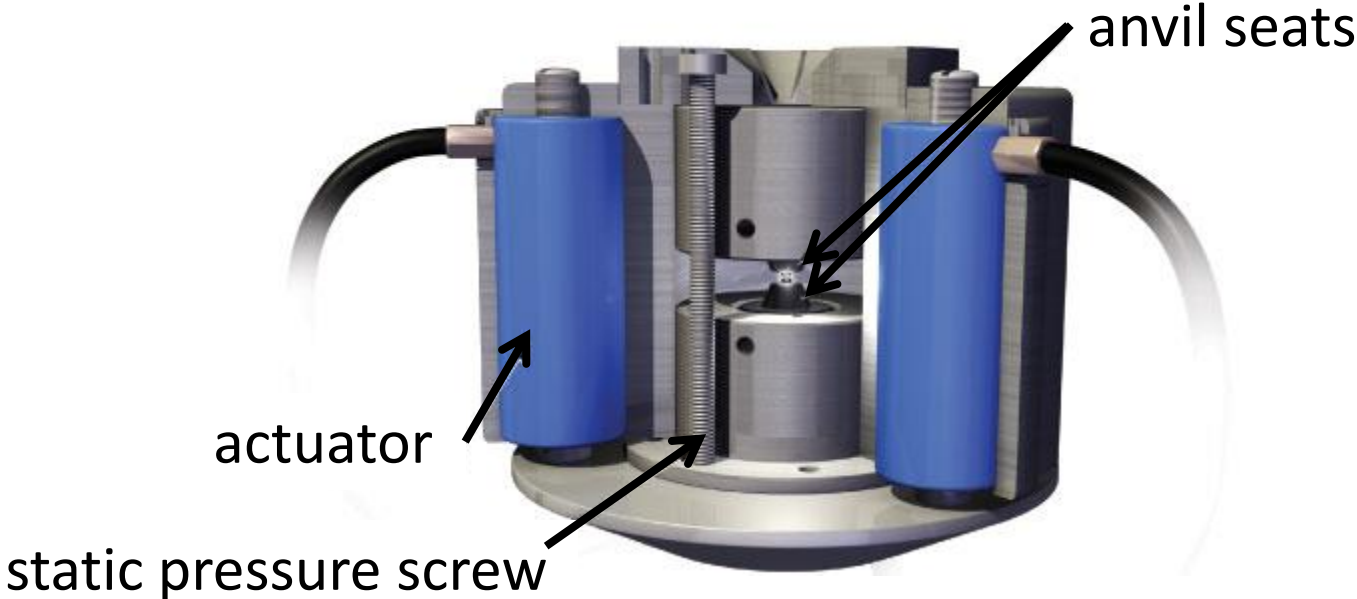
# For talks, superimpose a new label



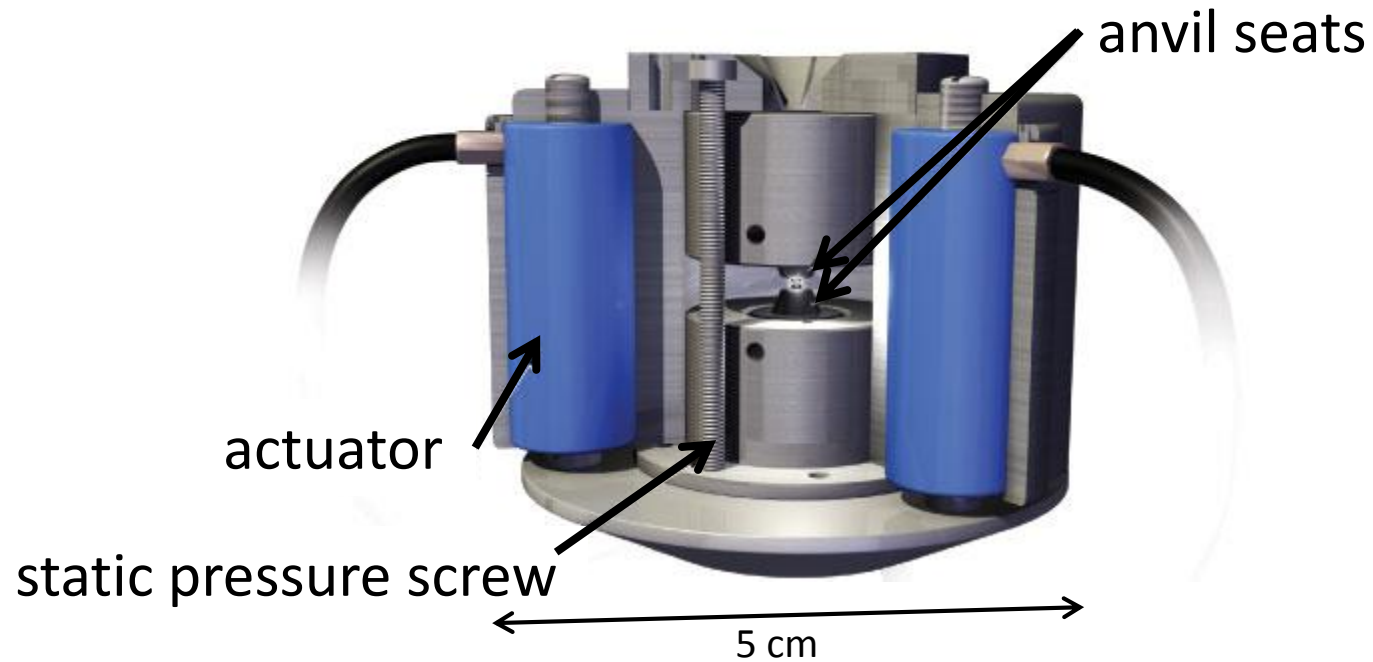
**Insert a text box, no outline,  
fill to match background**



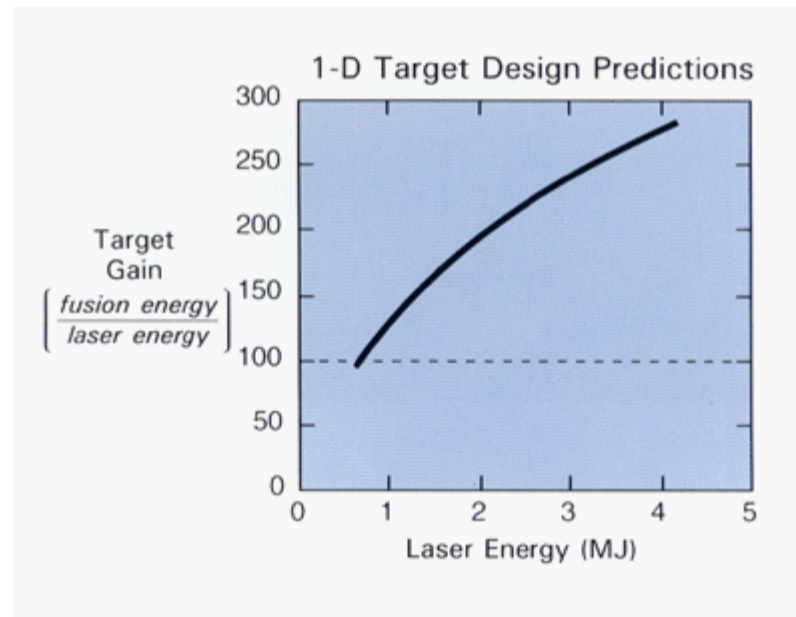
# Make the arrows big enough to see, too



# And always provide a scale

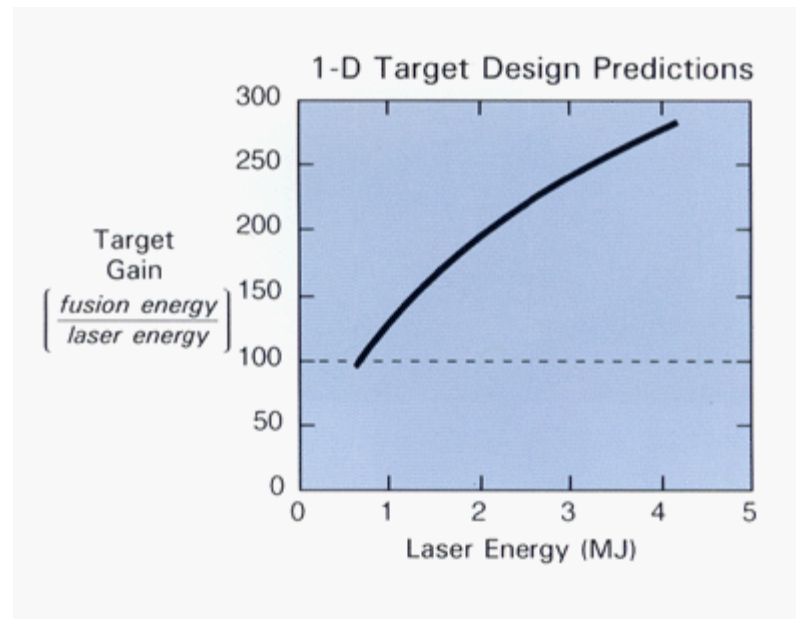


**State what the figure is showing before launching into an explanation of what it means**



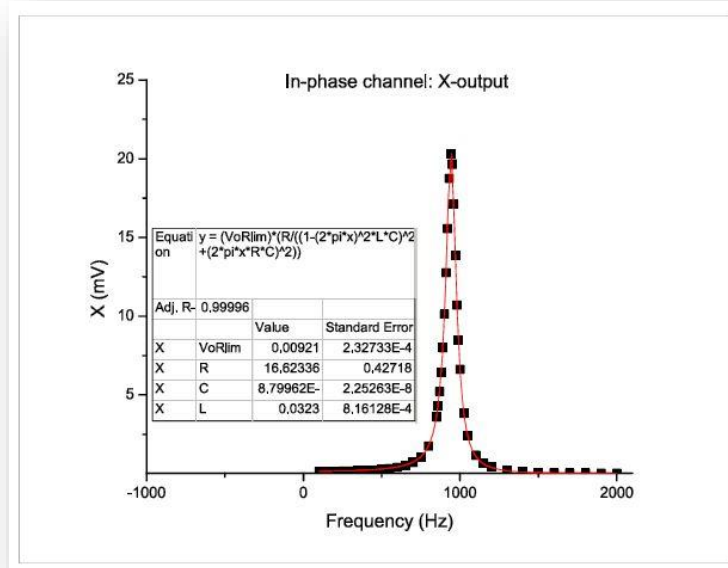
**Figure 3. The 1-D spherical target designs at NRL predict target gains of 100–300 for a few-MJ laser. This gain curve is an upper bound on possible target performance. A gain of at least 100 is required for fusion-reactor applications. (Courtesy U.S. Naval Research Laboratory)**

**State what the figure is showing before launching into an explanation of what it means**



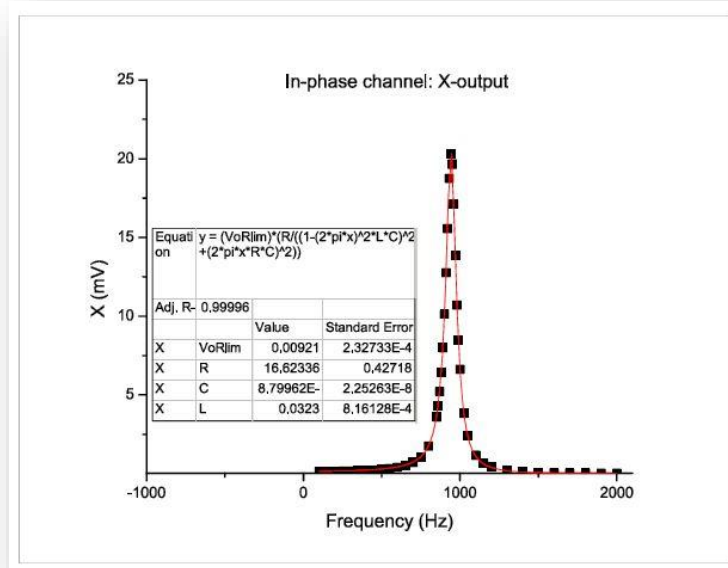
**Figure 3.** *Plot of target gain as a function of input laser energy; the dotted line indicates the minimum gain required for fusion reactor applications. The 1-D spherical target designs at NRL predict target gains of 100–300 for a few-MJ laser. This gain curve is an upper bound on possible target performance. (Courtesy U.S. Naval Research Laboratory)*

# Here's another example



**Figure 4.** The in-phase output voltage amplitude of an RLC circuit shows a clear resonant response frequency at a peak around 980 Hz.

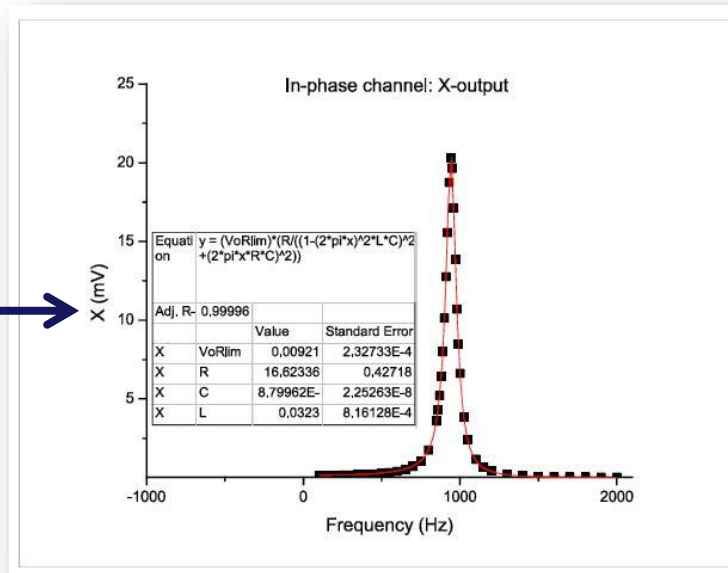
# Here's another example



**Figure 4.** Plot of the in-phase output voltage  $X$  vs. frequency. The in-phase output voltage amplitude of an RLC circuit shows a clear resonant response frequency at a peak around 980 Hz.

# Describe all key elements in the figure

Avoid inset tables if possible; they're usually too small to read



**Figure 4.** Plot of the in-phase output voltage  $X$  vs. frequency. Filled squares represent measured points, and the red line is a fit to the data using a Lorentzian lineshape. The inset table gives the fit parameters associated with the Lorentzian fit. The in-phase output voltage amplitude of an RLC circuit shows a clear resonant response frequency at a peak around 980 Hz.

# Number figures consecutively and “call them out” in the text



Microphotographic images of pressure-induced dendritic crystals (top row) are remarkably similar to the patterns produced in computer simulations of temperature-driven dendritic crystal growth (bottom row). [1]



# Number figures consecutively and “call them out” in the text



→ **Figure 6.** Microphotographic images of pressure-induced dendritic crystals (top row) are remarkably similar to the patterns produced in computer simulations of temperature-driven dendritic crystal growth (bottom row). [1] (Courtesy Lawrence Livermore National Laboratory)

# Identify parts of a figure by letters or numbers, not spatial descriptions

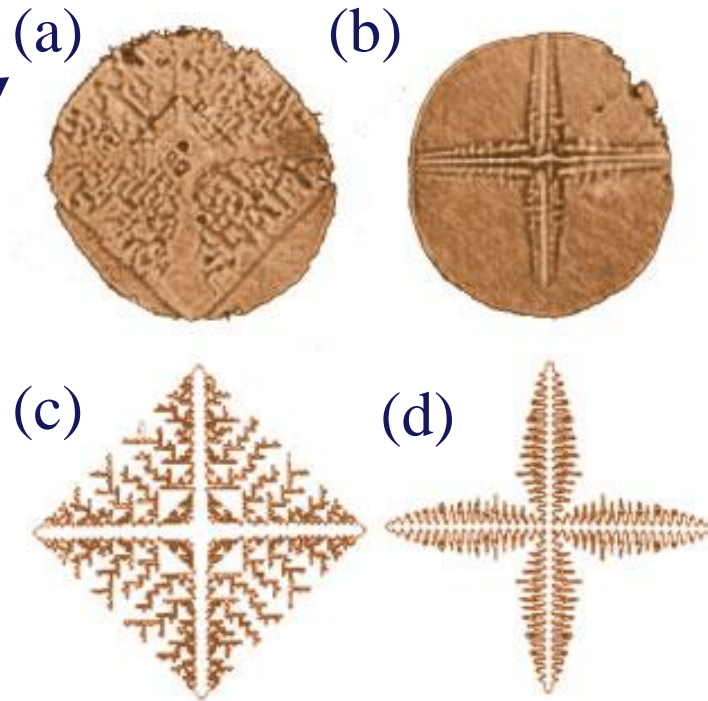
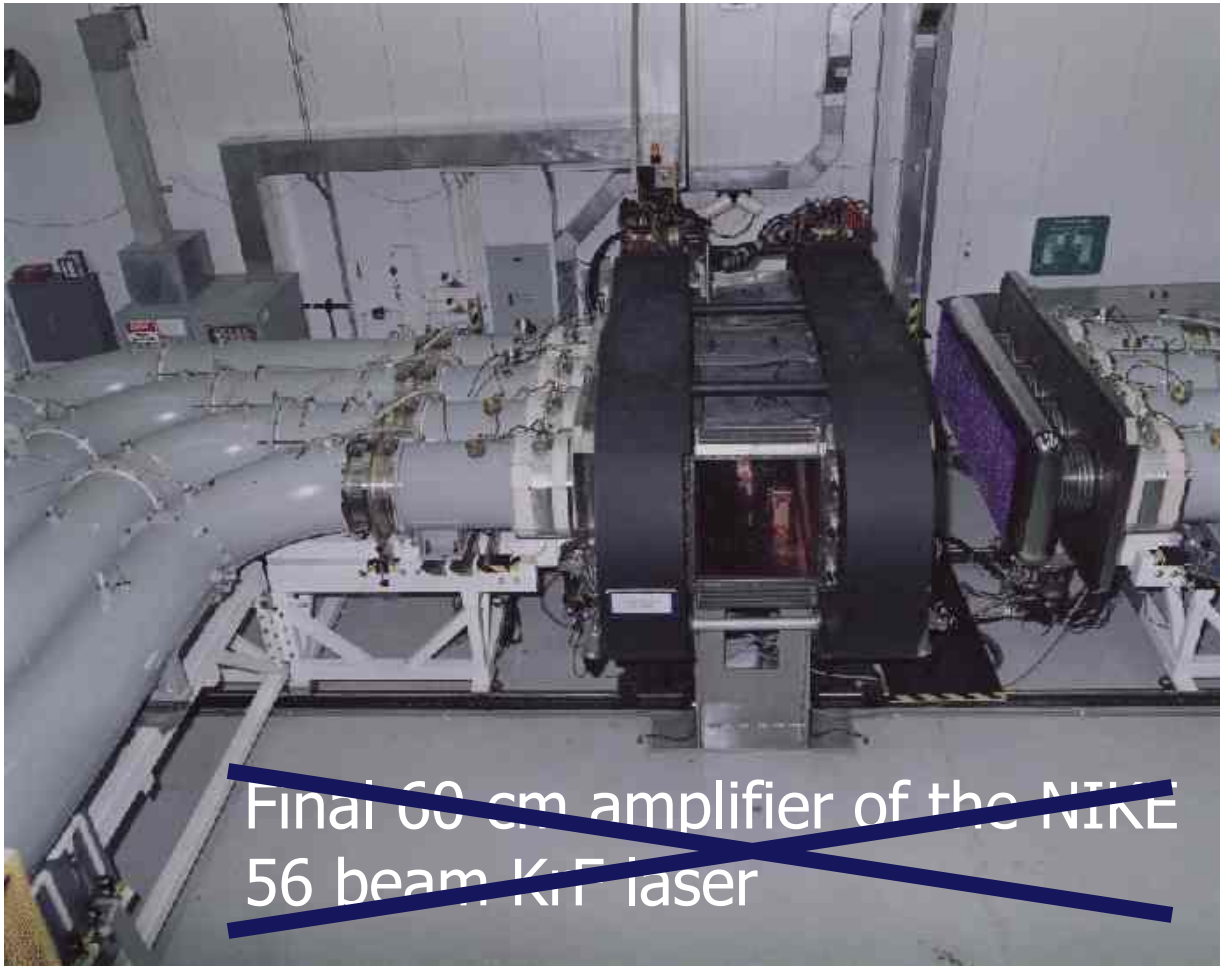


Figure 6. Microphotographic images of pressure-induced dendritic crystals (a, b) are remarkably similar to the patterns produced in computer simulations of temperature-driven dendritic crystal growth (c, d). [1] (Courtesy Lawrence Livermore National Laboratory)

**So that it can be copy edited, the caption should not be incorporated into the artwork**



~~Final 60 cm amplifier of the NIKE  
56 beam KrF laser~~

*(Image courtesy U.S. Naval Research Laboratory)*

# **Don Ranly's Rules for Captions\***

**Every picture needs a caption.**

**Captions are read five times more than the text.**

**Complement the image; say what it does not say.**

**Give useful information.**

**Connect the figures to the text. A good caption says  
“see story” without saying it.**

**Write complete sentences.**

**Use active verbs in the present tense.**

**→ The plot shows that a phase transition occurs at 77 K.  
A phase transition was observed at 77 K, as shown.**

**Scale the caption to the size of the image; captions  
should be at least two lines, optimum three lines,  
maximum four lines.**