

HOW DOES AN X-RAY LIGHT SOURCE WORK?

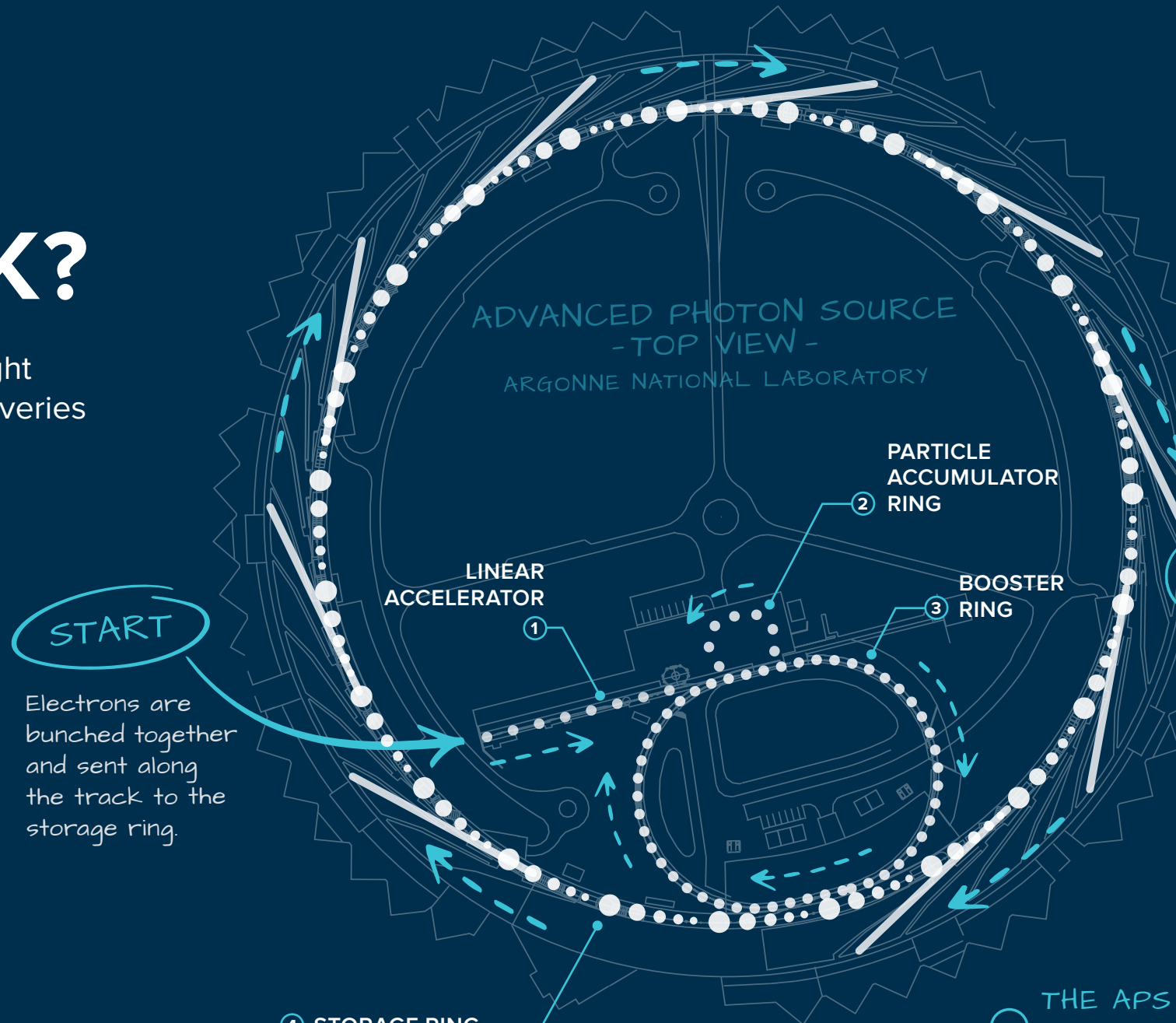
The Advanced Photon Source creates ultrabright X-ray beams to light the way toward new discoveries

A powerful light source such as the Advanced Photon Source (APS) is similar to the X-ray machines dentists use, except the light it creates is a billion times brighter.

The heart of the APS is a series of machines called accelerators that use magnets to move tiny particles called electrons. The electrons are bunched together and sent moving in a straight line down a ① linear accelerator. The ② particle accumulator ring groups the bunches closer together, and then the

③ booster ring circulates them as they build up speed and energy.

The particles are then injected into the ④ storage ring. Electrons travel around this ring billions of times a day. At each bend in the track, they release light in the form of photon particles. Those photons are the ⑤ X-ray light that is sent to scientific stations all around the ring. Scientists use that very bright light to see deep inside materials.



START
Electrons are bunched together and sent along the track to the storage ring.

SUPER-FAST ELECTRONS
Electrons move at nearly the speed of light, building up energy that is released as X-ray light.

THIS WAY TO SCIENCE
The X-ray beams are sent to more than 60 scientific stations around the ring to advance our understanding of materials, medicine, and much more.

THE APS IS HUGE!
○ APS outer diameter = 1,225 ft.
∧ Gateway Arch, St. Louis = 630 ft. tall

Learn more at www.anl.gov.