

## BATTERIES TO CHARGE FASTER FOR LONGER

Future EVs will need less charge time



Scientists at the Technical University of Munich have developed a clever new laboratory test procedure which could lead to much faster charging of the lithium ion batteries that EVs rely on for power.

While lithium ion batteries are fine if charged slowly, they can be damaged by charging too fast for too long. The effect is due to lithium metal plating of the graphite anodes inside each battery cell. As the plating builds up during repeatedly charging too fast, the battery capacity deteriorates and driving range is reduced. Public chargers today charge at a high rate until the battery reaches 80% charge and then back off to a much slower rate for this reason.

It's impossible to study an individual cell once it's shielded by a metal battery case, so the Munich team created a glass that exactly models the real thing. Using a process called electron paramagnetic response spectroscopy (EPR), scientists can accurately observe the build-up of plating as it happens. Until the technique was developed, there had been no analytical technique for measuring this process in real time. It is hoped it will make it possible to exactly predict the onset of plating and reduce the margins needed to protect batteries during fast charging. That in turn should lead to batteries that can be fully charged much faster than they are today.

The relatively long time to charge EVs compared with refuelling a conventional car could be reduced with new methods for side-stepping shortcomings in battery chemistry.

and 220 million in the following four years. 5G will provide the one gigabit per second (Gbps) bandwidth needed to support that with a capacity 1000 times higher than 4G. It will be faster too, at around 70Gbps compared with the average UK broadband connection of around 36Gbps.



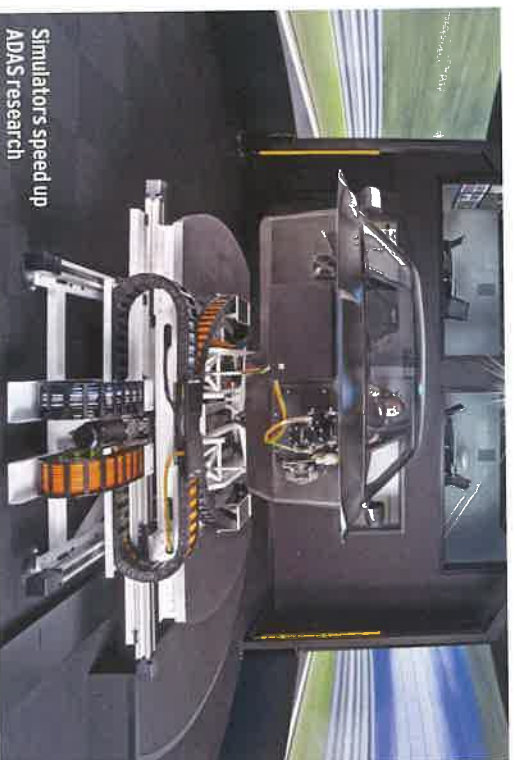
## HOW SIMULATORS IMPROVE DRIVER ASSISTANCE

The number of situations a critical advanced driver assistance system (ADAS) such as autonomous emergency braking (AEB) potentially have to deal with is mind-boggling. Truth is, it's impossible to set up and test every possible scenario, or even imagine what they could all be. There isn't the time, either. Ansible Motion, whose advanced simulators are used by a number of major car manufacturers, reckons doing so could take 100 years using conventional methods.

The latest simulators ease that problem by investigating a vast number of possible scenarios

in a very short time, crunching through them at lightning speed and compressing that 100 years of work into a few months.

The upshot should be more capable and reliable ADAS systems.



Simulator's speed up ADAS research

Driver assistance functions are manifold