How Indian Institute of Science, Bangalore, accepted Ajay Sharma's Generalized Form of Third Law of Motion?
Newton says Action and Reaction are universally equal. Sharma says it may not true due to the inherent characteristics, nature, composition, flexibility, elasticity etc. It is accepted, it must be recognized.

https://www.facebook.com/insighthp/videos/vb.171368279898150/271635199871457/?type=2&theater

Ajay Sharma paper : **Generalized Form of Newton's Third Law of motion and NASA's EmDrive. Thee paper has 17 pages and**

Free Link : http://www.gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/6746

Reference: Email from Official Email ID Professor V Venkataraaman venki@physics.iisc.ernet.in , sent by Chandrika Ramesh dated 6th February 2017.

"Ajay Sharma requests Professor V Venktaraman for open discussion , and the contents should be uploaded on U –Tube for global discussion."

The report is discussed taking various scientific sentences for easy understanding of common readers.

Part I

About Newton's Law and Generalized Law

Let me point out , my arguments are based on Newton's Principia (1686,1713, 1726) not on the textbooks which may be giving incomplete information of the law, without reading the Principia. My job is to read and interpret the Principia , and give correct explanation. Read exact version of the law from references below for proper understanding of the law.

[1] I. Newton, *Mathematical Principles of Natural Philosophy* (printed for Benjamin Motte, Middle Temple Gate, London, 1727), pp.19-20, translated by Andrew Motte from the *Latin*.

[2] I. Newton, *Mathematical Principles of Natural Philosophy* http://books.google.co.in/books?id=Tm0FAAAAQAAJ&pg=PA1&redir_esc=y#v=onepage&q&f=false accessed on 6th February 2017

Newton had given Three Laws of Motion very briefly at page 19-20.
Newton's definition of the Third Law.

'*to every action there is always opposed an equal reaction.*'

Action =- Reaction

Thus Action and Reaction are universally equal . No other factor (like nature and characteristics of body) is significant according to Newton's Third Law. UNFORTUNATELY, scientists do not raise the issues where law fails.

Generalized form of Newton's Third Law

'*To every action there may be reaction, but may or may not be always equal and opposite; depending upon the inherent characteristics of the interacting bodies.*'

Action = - K Reaction

The generalized law takes in account the significant factors e.g. inherent characteristics, nature, compositions, flexibility, rigidity, magnitude, size, elasticity, shape , distinctiveness of interacting bodies, mode of interactions, point of impact etc. The bodies may be of steel, wood, rubber, cloth, wool, sponge, spring, typical plastic, porous material, mud or kneaded flour or chewing gum specifically fabricated material etc. The interacting bodies may be solid, liquid, gas or mixture of all. . Even layman can justify the effect of these factors experimentally that for same action reaction is different. These are properties are taken in account by additional coefficient of proportionality in Generalized Law.
According to Newton's third law these are completely INSIGNIFICANT.
So the generalized form of the law is complete law.

Part II

It discusses how Professor V Venktaraman's comments support the Generalized Law .
Table III. It is regarding colliding different bodies on different surfaces.

First Sentence, Professor V Venktaraman says

"Again, in the next section and Table III, the author now uses forces for action and reaction and claims that third law is violated. Here the collision is inelastic and all textbooks of physics and students of physics know that in such inelastic collisions of macroscopic bodies, the bodies undergo deformations, they are not rigid, and some energy is converted to heat."

, **Ajay Sharma clarifies**

For the violation of the law Professor V Venkataman gives reason

," the bodies undergo deformations, they are not rigid, and some energy is converted to heat."

So he is supporting Generalized Form of Third Law of Motion. Professor should have also mentioned that

(a) friction between bodies and surfaces

(b) the point of impact of between bodies

(c) Whether both balls are of rubber or one ball is wood and other cloth (mass of each can be kept constant)

(d) Shape of ball (body) , whether spherical or square

(e) plus many other factors which are neglected by Law

play significant role. Even persons who do not know much science accept it.

Thus Professor V Venktaraman admits the role of inherent characteristics, nature, compositions, flexibility, rigidity, magnitude, size, elasticity, shape , distinctiveness of interacting bodies, mode of interactions, point of impact etc. Only Generalized Form takes them in account.

Further in Table II

I have given five examples with mathematical equations (from existing literature). Only in case of first example , Action = Reaction

In remaining four examples Action ≠ Reaction

(link to paper below)

http://www.gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/6746

The four examples make use of **law of conservation of momentum and kinetic energy**, but third law of motion is not obeyed. So all basic physics is taken in account. Moreover I have taken fours examples (where Third Law CLEARLY fails) from existing literature.

So everything is consistent, and **Newton's Third Law fails here;** apply Generalized law here. This is due to reason cited for Table III, Generalized Form Explained.

Thus, Professor V Venktaraman has admitted in explaining the Table III that Action and Reaction, are not equal due to inherent characteristics, nature, compositions, flexibility, rigidity, magnitude, size, elasticity, shape , distinctiveness of interacting bodies, mode of interactions, point of impact etc.

Similarly the failure of the Law in Table I

has not been commented by **Professor V Venktaraman .** Here also five examples are given. Only in one case Third Law is justified whereas it failed in other cases. It can be explained with help of generalized form of the Third Law .

Second Sentence, Professor V Venktaraman says

Here it is discussed , what are the terms Newton used to express Action and Reaction.

"The author starts by stating that Newton did not properly define action and reaction, whether it was velocity or force. This is probably correct, but all modern textbooks of physics and all students of physics know that action and reaction refer to forces, not velocities."

Ajay Sharma clarifies

Are we discussing Newton's law or interpreting the law willfully? If we are discussing Newton's Law then the Principia is the basis . That is why I have given print and online references above.

Kindly see the explanation at page 20 of the Principia , after the definition of the Third Law of Motion.

Newton had given three example which implies that Action and Reaction are expressed in terms of push or pull (force) and motion (velocity).

(a) " If you press a stone with your finger, the finger is also pressed by the stone."

Here Action and Reaction are in terms of push.

(b) "If a horse draws a stone tied to a rope, the horse (if I may so say) will be equally drawn back towards the stone":

Here Action and Reaction are in terms pull.

(c) "If a body impinges upon another and by its force change the motion of the other, that body also (because of the quality of, the mutual pressure) will undergo an equal change, in its own motion, towards the contrary part."

Here Action and Reaction are in terms of motion (velocity)

Thus Newton expressed Action and Reaction in terms of force and velocity

Professor V Venktaraman argues that he teaches to students,

'the Action and Reaction in terms of force only , not in terms of VELOCITY' .

Does he mean to say that part of Newton's Principia be erased, which states the Action and Reaction are expressed in terms of velocity ?

It would be correct thing to interpret Action and Reaction in terms of VELOCITY as new facts have been brought to light in the paper. **Hence Table I correctly demonstrate the failure of the law.**

Third Sentence, Professor V Venktaraman says

"Perhaps it needs to be extended if NASA EmDrive and other experiments finally confirm tiny violations";

Ajay Sharma clarifies

Let me clarify it is not tiny violation, when properly combined spacecraft can be launched with this system. American and Chinese scientists are working in this direction.
It is regarding NASA's latest EmDrive experiments where engine moved with help of microwaves , without exhaust (gases and smoke etc.). Thus there was Action and but NO Reaction. Hence Third Law is violated.

It was suggested by British satellite engineer , Roger Shayer in 2000, who first showed violation of third law. In 2008 Chinese scientists showed the same. In November 17 , 2016, NASA scientists published in peer review paper in Propulsion and Power.
So there are two options
(a) Either accept experimental results or perform contradicting experiments to NASAs results.
I have followed the scientific approach and given explanation to NASA s experiment.

Chinese scientists claimed on 10 December 2016, they have successfully conducted these experiments earlier and doing the same in Tiangong-2 space station. The results were not published or at least I do not believe they are wrong . May be commercial and political compulsions have forbidden them to publication of the results till mission is over.

Part III

As a referee of Current Science, a Professor of Indian Institute of Science Bangalore has accepted the truth, so it must be recognized by publication.

Comments are expected to improve the work further and raise Indian Tricolor to new heights in science. Everyone hope eminent physicist and alternative science enthusiast **Professor V Venktaraman** will appreciate author and provide his able guidance as per status of IISc. Banglore.

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Video Link **"Newton did not discover second law of Motion F =ma "** It is superstition "Euler discover F =ma in 1775" see paper at website of Mathematical Association of America, Washington USA
https://www.facebook.com/insighthp/videos/vb.171368279898150/271635199871457/?type=2&theater

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