

ALLADI RAMAKRISHNAN  
DIRECTOR

# MATSCIENCE

*Institute of Mathematical Sciences*  
Central Polytechnic Bldgs. Madras-20 (India)  
443761  
Telegrams: MATSCIENCE Tel: Office 43361 Res. 74437 & 71106

24th February 1968

Dear Professor Madhava Rao,

There will be a one-day symposium on Sunday,  
3rd March 1968 commencing at 10 A.M. at the Institute  
of Mathematical Sciences on

"Faster than Light Particles"

in which Professor E.C.G. Sudarshan of Syracuse Uni-  
versity (USA) will deliver an introductory lecture.

We cordially invite you to participate in the  
symposium. If you are willing to give a half-an-hour  
talk, we can make available to you an honorarium of  
Rs.75/- to meet your travel and staying expenses.

Yours sincerely,

*Alladi Ramakrishnan*  
(Alladi Ramakrishnan)

Professor B.S. Madhava Rao, D.Sc., F.N.I.,  
Kanakanahalli Road,  
(near Lalbagh Circle),  
Basavangudi,  
Bangalore-4.

Dear Prof. Ramakrishnan,

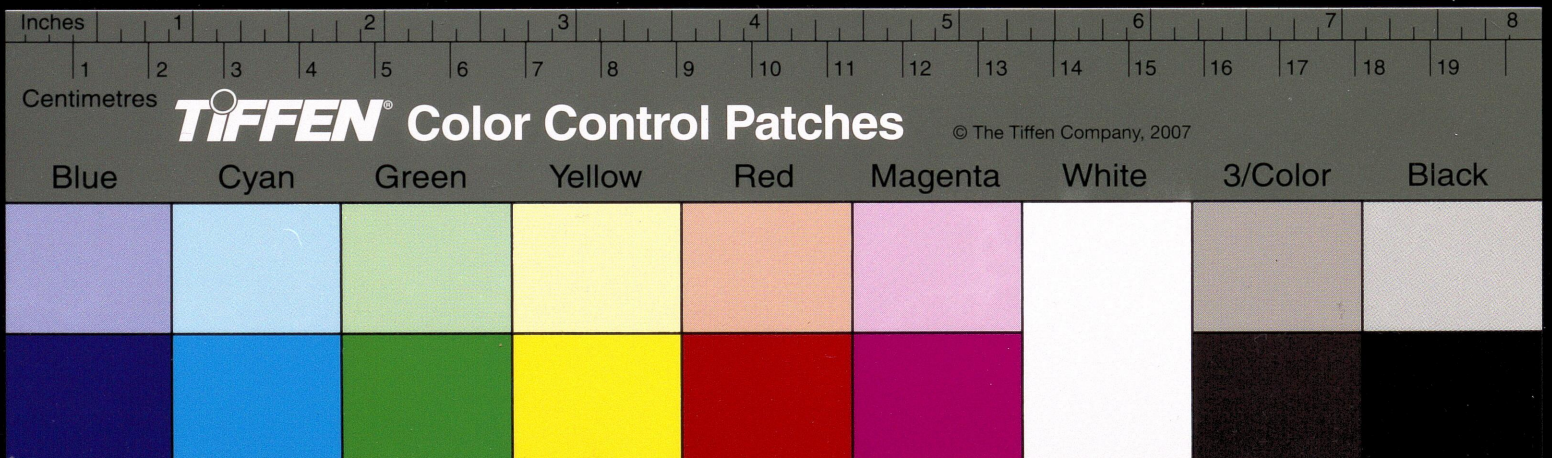
It was very kind of you to have invited me to attend the Symposium at  
your Institute on 3/3/68. When Mr. Prof. Sudarshan met me at my residence a  
few days back, I told him that I would do my best to attend, and talk about  
lepton conservation. Unfortunately, circumstances at home have so developed as  
to prevent me from leaving Bangalore for nearly a week. Please convey my apologies to  
Prof. Sudarshan also.

Incidentally, may I take this opportunity of congratulating you on the writing of the  
beautiful book on Elementary Particles and Cosmic Rays?

Yrs sincerely  
*Prof. R.*

Write & post  
this letter today.

RM  
29/2/68



# Faster Than Light Particles

By B. S. Padmanabhan

Who is the originator of the revolutionary concept which contradicts Einstein and says that particles travelling faster than light exist in this universe? A recent American Press report gives credit for this discovery to Dr. Gerald Feinberg, a Columbia University professor, but an Indian scientist working at Syracuse University has challenged this claim.

The 36-year-old Indian scientist, Dr. Ennaikal Chandy George Sudarshan, now teaching physics as a Visiting Professor in Delhi University, propounded this theory ten years ago and a detailed scientific account jointly prepared by him and two other scientists—Dr. V. K. Deshpande and Dr. O. M. P. Bilaniuk—was published in the *American Journal of Physics* in 1962.

In fact, Dr. Feinberg, to whom credit is now sought to be given for the theory, has himself acknowledged in his paper the work of Dr. Sudarshan and his group. Dr. Feinberg has also sought to explain the existence of the faster-than-light particles within the framework of quantum mechanics.

But Dr. Sudarshan has challenged Dr. Feinberg's conclusions as being not in accordance with the Relativity Theory. On the other hand, working in collaboration with Prof. M. E. Arons of City University of New York, Dr. Sudarshan has constructed a theory of faster-than-light particles in accordance with the Theory of Relativity and incorporating the principles of quantum mechanics. This has been submitted to the *Physical Review*—journal of the American Physical Society, for publication.

This new concept opens up possibilities of removing one of the great obstacles to communication between civilisations that exist on distant worlds as it has been believed hitherto that energy cannot be transmitted at speeds greater than light. What has been done so far is only the postulation of the concept, and much will depend upon the result of the search for these particles initiated at the Nobel Institute in Stockholm and Princeton University.

Dr. Sudarshan made his discovery while he was a professor at the University of Rochester. He called these particles "Class III particles", while Dr. Feinberg has named them Tachyons. According to Dr. Sudarshan, most of the subatomic particles like electrons, protons and neutrons belong to Class I since all of them travel with less than the speed of light and the very penetrating elusive particles like neutrinos belong to the Second Class which travel always with the speed of light. The newly discovered particles have been put in the third category. When one recalls that light travels at the rate of 186,000 miles per second one can imagine how fast these new particles must travel.

These particles show peculiar features which look absurd at first sight, said Dr. Sudarshan in an interview. These particles can never go slower than the speed of light and there is no upper limit to their speed. He said that by applying the rules of the Theory of Relativity in a straightforward manner it would appear that these particles can not only travel at an arbitrarily high speed and cover an enormous distance in no time at all, but they can even arrive at their destinations earlier than they started. This would indeed be absurd. But according to Dr. Sudarshan, the physical interpretation in this case is that such a particle is travelling in the opposite direction.

Dr. Sudarshan said the role of these particles in the subnuclear world was under active study by many theoretical physicists, but

already two important theories of the sub-nuclear domain needed such particles. One was the theory advanced 30 years ago by the late Italian physicist Majorana and the other was the theory of the Japanese physicist Yukawa, who was awarded a Nobel Prize for his theoretical work.

## UNIQUE NEW THEORY

Hailing from Kottayam, Dr. Sudarshan made his mark 11 years ago when, in collaboration with Prof. Robert Marshak, he discovered a fundamental law of weak interactions. This was the result of his work for a doctoral thesis at the University of Rochester. Since then he has been ranked among

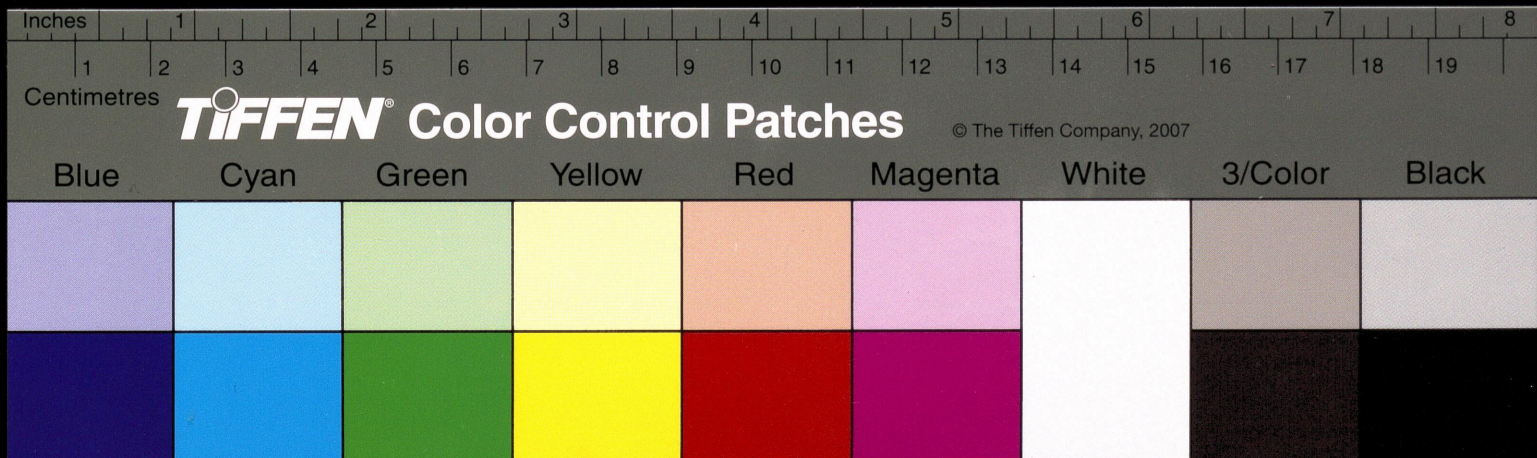


the top theoretical physicists. Recently, he has followed up this work with a theory called the Theory of Universal Primary Interactions. This is regarded as unique and is said to have in its favour the ability to tie together previously unrelated phenomena of particle physics although it has not yet predicted any unknown phenomena.

Dr. Sudarshan went to the U.S. in 1955 and during the last 13 years he has held many important positions. He was first with the University of Rochester, and then went to Harvard. He returned to Rochester in 1959 and four years later worked in the University of Berne (Switzerland). During this period he was also a Visiting Professor of the Institute of Mathematical Sciences at Madras. From 1964 he has been with Syracuse University as Professor and Director of the Research Programme in Elementary Particle Physics. He will be in Delhi for two months more and then go to Moscow at the invitation of the Joint Laboratory of Nuclear Research. From Moscow he will go to the International Centre for Theoretical Physics in Trieste (Italy) and then attend a conference organised by the Swedish Nobel Foundation. He will return to Syracuse University in September this year.

Before going to the U.S. in 1955, Dr. Sudarshan worked as a research assistant at the Tata Institute of Fundamental Research in Bombay. He had his collegiate education at the Madras Christian College from 1948 to 1951.

Dr. Sudarshan's wife is the daughter of Mr. Nittoor Srinivasa Rao, former Chief Justice of Mysore and at present Chief Vigilance Commissioner. An electronics engineer, she was working at the Tata Institute of Fundamental Research when she first met Dr. Sudarshan. After going to the States, she got a master's degree in chemical engineering also.



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## TENDER NOTICE

Sealed tenders are invited in prescribed form for the supply, fabrication and erection of seven (7) batteries of cyclones for cleaning dust laden air from the Centralized exhaust ventilation system of high lines and associated conveyor galleries of the Blast Furnace Plant of Bokaro Steel works as per specification BSL-S/02-1.

Description	Approx. tonnes.
Seven (7) batteries of Cyclones (equipment No. 36/392) comprising of:	460 T.
(i) Body of the battery of cyclones.	
(ii) Cyclone elements with directing device.	
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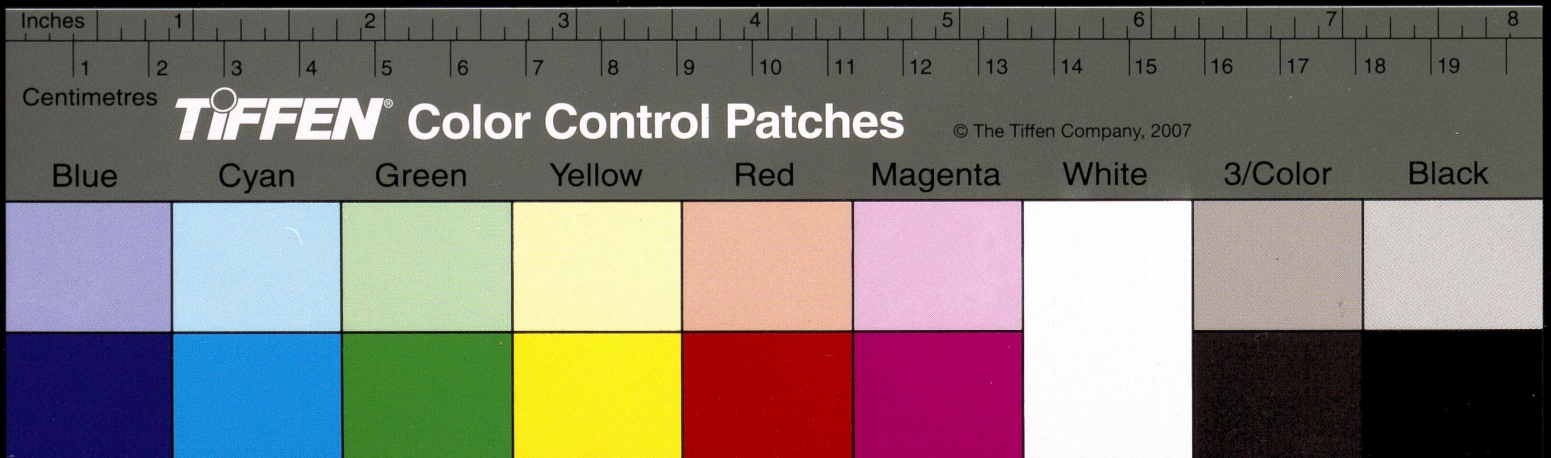
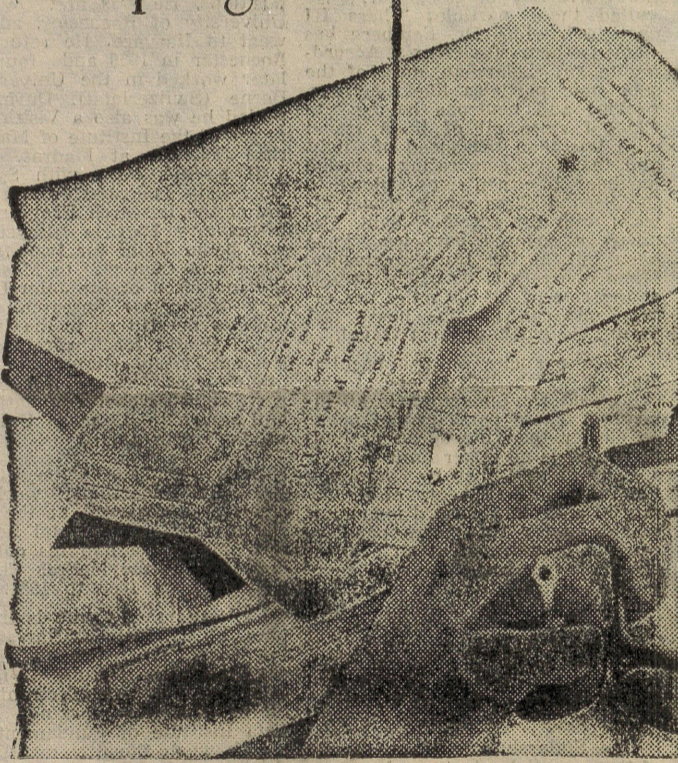
Tender documents in duplicate can be had from the office of the Chief Engineer, Bokaro Steel Limited, Bokaro City, Bihar from 1st March, 1968 to 22nd March, 1968 on all working days, except on Sundays and Holidays, on payment of Rs. 100/- (Rupees One Hundred only) per set towards the cost of tender documents, which is non-refundable. Requests for mailing the tender documents will be entertained only on receipt of the cost of the tender documents (Rs. 100/-) plus/- (Five) as Postal Charges. The money may be remitted either in cash or by a crossed Postal Order or Bank Draft favouring Bokaro Steel Limited, Bokaro Steel City. Bokaro Steel Limited takes no responsibility for delay, loss or non-receipt of tender documents after despatch.

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The Chief Engr. reserves the authority to accept a tender in whole or in part or reject any or all the tenders without assigning any reason.

CHIEF ENGINEER  
BOKARO STEEL LIMITED.

keeping of account



Prof. Alladi Ramakrishnan

**MATSCIENCE**

INSTITUTE OF MATHEMATICAL SCIENCES,

MADRAS-20. (India.)

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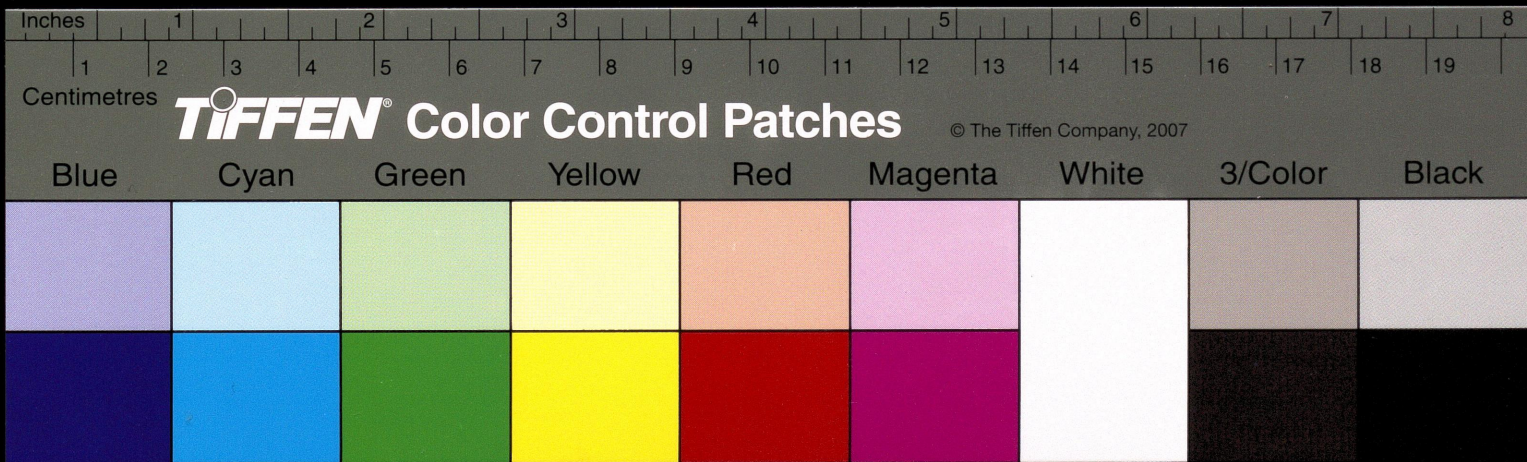


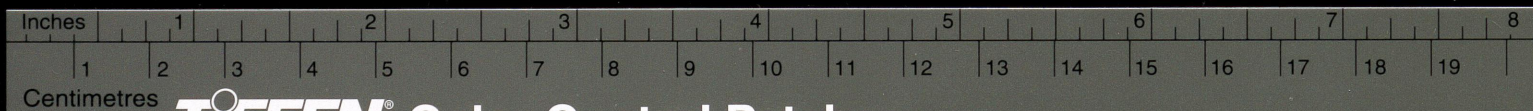
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Professor B. S. Madhava Rao, D.Sc., F.N.I.,  
Kanakanahalli Road,  
(near Lalbagh Circle)  
Basavangudi,

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Bim  
25/2/68





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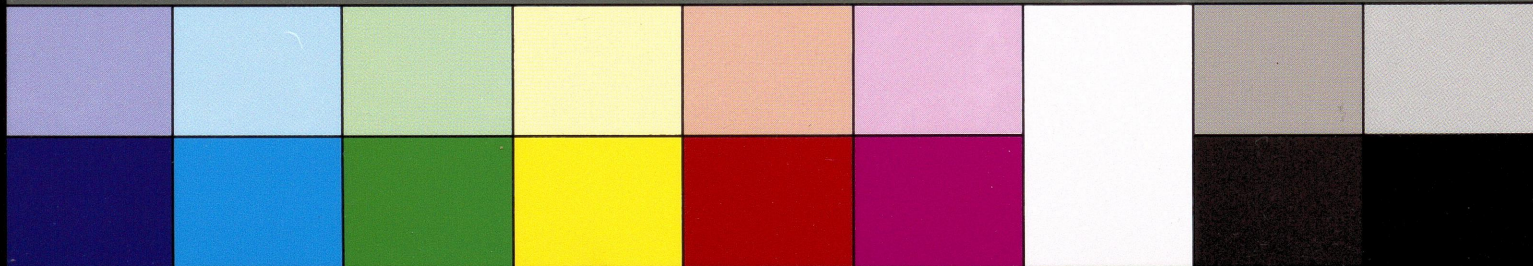
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E. C. G. SUDARSHAN

Professor of Physics, Syracuse University.

SYRACUSE,  
N. Y. 13210

